

# Appendix E

## Guidelines

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## **I. COMBUSTIBLE GAS INDICATOR (CGI) GUIDELINE**

Contractors responsible for underground storage tank (UST) closure, repair, or re-piping work, must have a Combustible Gas Indicator (CGI) at the work site at all times. This instrument must be used to ensure that 20% of the lower explosive limit (LEL) is not reached within the UST or work area surrounding the UST. It is also recommended that the level of oxygen be measured, in addition to the LEL, with either a separate oxygen meter or with a combination CGI/Oxygen meter. Primary authority for fire and explosion safety at a UST work-site rests with the local fire agency.

All DEH personnel will enforce the safety precautions outlined below during repair or removal of USTs. At the location of a UST removal or repair project, where flammable chemicals have been stored, DEH staff will require the contractor to demonstrate that the work site is safe. However, the local fire agency has primary authority over fire safety and this guideline is not intended to supersede that authority.

In order to prevent an explosion, the following minimum procedures shall be taken by an applicant for the removal of a UST:

- A. The applicant or contractor shall have a CGI, capable of measuring LEL in percentages, present at the work site during all times when work is being conducted on or around USTs. The CGI must be maintained in good repair and calibrated in accordance with the manufacturer's specifications. The CGI must be calibrated so as to detect the LEL of the product in the UST, or the LEL of an indicator chemical that is a component of the product in the UST.
- B. The contractor shall be responsible to ensure that flammable vapors around the work area and within the UST are not in explosive concentrations. Non-explosive conditions will normally be demonstrated by assuring that vapors within excavations, the work area, and the UST being removed, are less than 20% of the LEL. If the UST being removed cannot be evacuated and purged of vapors prior to the beginning of excavation work, then the UST may be maintained non-explosive by maintaining vapor concentrations (within the UST) above the upper explosive limit (UEL). The UST contractor must obtain concurrence from the local Fire Department and DEH before conducting excavation work using the UEL to maintain non-explosive conditions. A UST should not be moved until it has been "inerted" to less than 20% of the LEL.
- C. The CGI and CGI calibration kits must meet the following minimum specifications:
  - 1. The CGI must have a direct readout that indicates the percentage of the LEL being measured.
  - 2. The CGI must be intrinsically safe.
  - 3. The CGI must have a probe capable of testing the interior of the UST.
  - 4. The CGI must be calibrated using substances that approximate the vapors being tested.
  - 5. The CGI may require a dilution fitting to be capable of giving an accurate LEL reading in the absence of oxygen.
  - 6. The CGI must be capable of being field calibrated.
  - 7. The CGI must be routinely calibrated as required by the manufacturer.

## **II. UNDERGROUND STORAGE TANK SOIL SAMPLING GUIDELINE**

## **UNDERGROUND STORAGE TANK SOIL SAMPLING GUIDELINE**

In San Diego County, the Department of Environmental Health (DEH) is the local oversight agency. DEH has established the following guidelines for routine soil sampling and analyses as a condition of all UST closure (removal) permits. Samples are required when soil appears to be clean. At sites with obvious contamination, a full assessment will be required; routine samples may not be required at the time of inspection.

### **A. UST Owner/Operator**

The UST owner/operator is required to have the following items at the site and to have made the following arrangements prior to UST removal:

1. Person to take the samples - this does not need to be an environmental consultant.
2. Sample containers.
3. Labels for the containers.
4. Ice chest with dry ice or blue ice.
5. Backhoe, or similar excavating device, which can be used to remove backfill and native soil from the UST excavation in a safe manner.
6. Sample-taking device (trowel, hand auger, disposable gloves).
7. Materials for cleaning the sampling tools, if tools are to be reused (e.g., bucket, water, and cleaning agent).
8. Person and transportation to deliver sample to laboratory.
9. Advance arrangements with a State-certified hazardous waste laboratory to perform the analyses.
10. Submit copies of laboratory results and the chromatogram for the analysis to DEH.

### **B. DEH Hazardous Materials Specialist**

The DEH inspector will be responsible for the following:

1. Documenting the UST removal.
2. Documenting conditions of the UST, piping, and soil.
3. Providing chain-of-custody form.
4. Identifying sampling locations.
5. Selection of analytical methods.
6. Evaluating laboratory analyses data upon receipt.

### **C. Required Sampling Supplies**

The following chart (Table E-1) can be used to estimate the number of required samples based on the UST size and the length of piping. Knowing the approximate number of samples to be collected can help estimate the necessary sampling supplies and to ensure that these supplies are at the work site at the time of the UST removal. Refer to Table 5-4 in Section 5 for the required laboratory analysis. Final approval of a UST closure (removal) cannot be given by the DEH until all laboratory data and supporting information have been received and evaluated.



**TABLE E - 1: APPROXIMATE NUMBER OF SAMPLES FOR UST REMOVAL**

<b>UST SIZE (GALLONS)</b>	<b>NUMBER OF SAMPLES FROM EXCAVATION PER UST</b>	<b>NUMBER OF SAMPLES FROM PIPING TRENCH PER 20 LINEAL FEET</b>
1 - 10,000	Two	One
10,001 – 20,000	Three	One
20,001 – 30,000	Six	One
> 30,000	Contact DEH	One

### **III.BURN ASH INVESTIGATION GUIDELINES**

LEA Advisory #56 November 4, 1998

Publication #231-98-019

## Process for Evaluating and Remediating Burn Dump Sites

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### *To All Local Enforcement Agencies:*

This Local Enforcement Agency (LEA) Advisory covers the process for evaluating and remediating burn dump sites. The purpose of this LEA Advisory is to:

- Provide guidance on the appropriate procedures to follow in evaluating the risks to public health and safety and the environment posed by burn ash dump (burn dump) sites that contain non-Resource Conservation and Recovery Act (RCRA) waste.
- Identify the steps to take to control these risks.
- Describe the roles of other regulatory agencies in burn dump regulation.
- Address burn dump issues raised at the November 1997 Partnership 2000 Conference at Asilomar.

### **What Is a Burn Dump?**

A burn dump is a site where solid waste has been burned at low temperature and the residual burn ash and debris have been landfilled or stockpiled. The burn ash referred to in this document is the residual ash that results from the low temperature combustion of solid waste. Ash from controlled incineration at a permitted facility, such as a waste-to-energy plant, is not included in this advisory.

Burn dumps typically contain little biodegradable organic material because of the combustion of waste materials and the age of the sites. Therefore, typically little or no landfill gas is being generated at burn dump sites.

Burn dumps were phased out in the early 1970s in response to federal and state air quality legislation. Most burn dumps are considered closed sites as their operations ceased prior to the development of regulations addressing the closure of disposal sites, provided that these sites were operated under applicable permits at the time. If these sites were not operated under applicable permits at the time they would be considered illegal disposal sites.

### **What Are the Problems and Hazards Associated with Burn Dumps?**

An increasing number of burn dumps are identified in site assessments conducted by the LEAs and the California Integrated Waste Management Board (IWMB). Laboratory tests of ash from a number of burn dump sites show that the burning of nonhazardous household or municipal waste tends to concentrate certain metals to levels that are hazardous under California regulations and, on occasion, federal regulation. The potential threat from burn ash to public health and safety and the environment may be minimal if the sites are located in remote, less populated areas of the state where public contact is limited or nonexistent. However, in heavily developed areas where land is scarce and expensive there is increasing interest in developing burn dump sites. Before a burn dump site is developed the associated health and environmental risks should be addressed through a waste characterization study as described in Attachment 1.

Test results indicate the predominant metals of concern in burn ash (i.e., arsenic, beryllium, cadmium, chromium, copper, mercury, nickel, lead, and zinc) are not readily soluble in water; therefore, not readily leachable into ground water. However, burn ash does pose a risk if it becomes airborne, is eroded into surface water, or comes in contact with skin. The potential routes for human exposure to the contaminants in burn ash are inhalation, ingestion, and direct skin contact. Exposure to contaminants via any of these routes may result in adverse health effects. Attachment 2 briefly describes the adverse health effects of the metals most commonly found in burn ash. Burn dump problems and potential hazards result primarily from:

1. Improper cover contributing to hazardous burn ash becoming airborne and being inhaled by humans or animals.
2. Inadequate erosion protection contributing to transport of hazardous burn ash into surface waters and being ingested by humans and animals.

3. Improper site security allowing human or animal access to areas of hazardous waste and hazards from direct contact, inhalation, and ingestion.
4. Burn dumps not recorded at the local level allowing construction or other improper land use on or adjacent to hazardous burn ash and long term threats to public health and safety and the environment.

### **Burn Ash Characterization**

The main concern when evaluating a burn dump is determining whether or not the burn ash and residues are hazardous. To determine whether or not a burn ash is hazardous a burn ash characterization study (i.e., waste characterization study) is performed. In a waste characterization study burn ash samples are taken and analyzed using a specified sampling methodology and set of test protocols. Each test protocol produces its own specific type of information for a given range of conditions. The waste characterization study is described in Attachment 1.

### **Who Regulates Burn Dumps?**

#### ***LEA/IWMB Authority***

The authority that allows LEAs and the IWMB to investigate and inspect burn dumps is contained in Public Resources Code (PRC) section 44100. This section states in part that:

....the enforcement agency, in issuing or reviewing any solid waste facilities permit or in connection with any action relating thereto or authorized by this division, may investigate the operation by any person of a ...disposal site....

"Disposal site" is defined in PRC section 40122 which states in part:

"Disposal site" or "site" includes the place, location, tract of land, area, or premises in use, intended to be used, or which has been used, for the landfill disposal of solid wastes.

Solid waste is defined in PRC section 40191, which states that solid waste does not include hazardous waste or low level radioactive waste regulated under Chapter 7.6 of the Health and Safety Code. When burn ash is classified as a RCRA hazardous waste the IWMB and LEA do not have the authority to, and will not, regulate the site, even if the waste was derived from solid waste. However, when burn ash is classified as a California hazardous waste there are circumstances where the IWMB and LEA may regulate the burn dump site.

The burn ash at most burn dump sites in California meets the criteria to be classified as a California hazardous waste. However, because of the limited solubility of burn ash metals in water, the risk posed by these sites is effectively controlled when a few straightforward precautions are taken. To acknowledge this reduced risk under specified conditions IWMB and Department of Toxic Substances Control (DTSC) jointly developed a streamlined, coordinated regulatory approach for burn dump sites outlined in a memorandum dated March 3, 1995 (Attachment 5). Under this streamlined, coordinated regulatory approach the LEA and IWMB are given the responsibility to regulate burn dump sites, with limited DTSC involvement. Out of four scenarios in this streamlined approach DTSC involvement is required in only the fourth scenario. The approach is described in Attachment 3 and graphically represented in Figures A, B, C, and D.

Also, under some conditions the owner of a burn dump site may request from DTSC a nonhazardous determination or a blanket variance for closure. Under this scenario the IWMB and LEA may replace DTSC as the regulating agency. This is explained in more detail in following sections and attachments. In the event that the waste characterization study demonstrates that the ash does not meet the criteria for being classified as a California or RCRA hazardous waste, DTSC involvement in any site activity, including removal of ash, would not be necessary. If the waste characterization study demonstrates that the ash contains a non-ash California hazardous waste fraction DTSC should be contacted to determine how to proceed. However, regardless of whether the ash is hazardous or not, the LEA should coordinate with the Regional Water Quality Control Board (RWQCB).

Also, California Code of Regulations, Title 27 (27 CCR) section 21100(d) allows the enforcement agency to apply closure regulations, on an as needed basis, to closed sites not having approved closure plans and to illegal or abandoned disposal sites. Section 21100(d) states that:

Closed sites for which closure plans were not approved pursuant to §20164 or §21099, and illegal or abandoned disposal sites which pose a threat to public health and safety or the environment shall implement the provisions of these regulations as required by the EA.

### ***DTSC Authority***

If burn ash is classified as a RCRA hazardous waste DTSC is the lead agency and regulates the site in accordance with California Code of Regulations, Title 22 (22 CCR). If burn ash is classified as a California hazardous waste DTSC would normally be the lead agency and would regulate the site in accordance with 22 CCR. However, as discussed above, under some circumstances the authority to regulate burn dump sites is given to the LEA and IWMB.

### ***Regional Water Quality Control Board Authority***

The RWQCB has authority to regulate burn dumps regardless of whether the waste has been determined to be hazardous or non-hazardous. Regulations that the RWQCB use to govern burn dump sites are contained in 27 CCR.

### ***Proposed Changes to Hazardous Waste Regulations***

Currently, DTSC is proposing changes to 22 CCR through a process termed the "Regulatory Structure Update" (RSU). Where most hazardous wastes are now subject to the same management standards DTSC is proposing to create two hazardous waste tiers based on risk, fully regulated hazardous waste and special waste. The first tier is for the higher risk waste streams, which are fully regulated hazardous wastes. This tier is subject to all hazardous waste regulatory requirements. These Tier 1 wastes would be regulated in the same way all hazardous waste is currently regulated in California. The second lower-risk tier would be special wastes. Tier 2 will be a more comprehensively defined waste category that includes a broader range of wastes. These Tier 2 wastes are lower-risk wastes than those in Tier 1 and have fewer regulatory requirements. Although special wastes would have fewer requirements there would be no reduction in protection of public health and safety and the environment. One possible result of DTSC's RSU on the regulation of burn dump sites may be that some of these sites will fall into a lower category of risk; therefore, regulated at a lower level. Once DTSC completes the RSU process this advisory will be reviewed to determine if a revised/updated advisory is necessary.

### ***What Procedures Should Be Followed to Regulate Burn Dumps?***

Since most burn dumps can be classified as closed, illegal, or abandoned sites their identification and initial assessment should be accomplished using the Site Identification Process (SIP) or similar procedure. The guidance for the SIP is contained in LEA Advisory Numbers [3](#) and [9](#). The assessment in the SIP would determine whether there is an imminent threat to the environment or public health and safety. It is important that at a minimum the investigator evaluates the following:

1. Degree of burn ash exposure.
2. Adequacy of erosion control.
3. Site security including fencing and signage.
4. Whether the condition of the property is recorded showing the location of the burn dump, possible hazardous constituents present, excluded postclosure land uses (PCLU), and procedures for the development of the property for excluded land uses.

Additional areas of concern might include burning waste and underground fires.

Once this initial assessment has been completed, refer to Attachment 3 to determine the appropriate procedure to follow for the specific site. These procedures are intended to provide guidance for properly remediating burn dump sites.

**Because site conditions will vary, some or part of the procedures or the level of detail may not be applicable in all cases.** For example, in rural areas where there may be fewer sensitive receptors and a lower risk to human health and safety a less rigorous waste characterization may be appropriate. In urban

areas, because of the higher concentration of sensitive receptors and higher human health and safety risks, a more rigorous waste characterization may be necessary. **However, it is important that coordination occurs between all regulatory agencies to assure that the appropriate mitigation measures are implemented.**

If you should have any questions regarding the regulation of burn dumps please contact the Remediation, Closure and Technical Services Branch staff person assigned to assist your jurisdiction.

Sincerely,

Julie Nauman, Acting Deputy Director  
Permitting and Enforcement Division

**Attachments:**

## **Attachment 1**

### **Characterizing Burn Dumps in California**

#### **Background**

Based on several burn dump investigations California Integrated Waste Management Board (IWMB) staff have determined that there may be elevated levels or hazardous levels of arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, and zinc in the soil/ash. Also, low levels of total recoverable petroleum hydrocarbons and/or low to nondetectable levels of semivolatile organic compounds, polychlorinated biphenyls (PCB), dioxins, and furans may be present in burn ash. The pH in the burn ash is expected to range from 6.0 to 9.0. When waste characterization of a burn dump is necessary an investigation must be performed to delineate the nature and extent of the waste and to determine if the burn ash is a Resource Conservation and Recovery Act (RCRA) hazardous waste, a non-RCRA hazardous waste (designated California hazardous waste), or a nonhazardous solid waste. Once the waste classification is established, the appropriate and effective remediation measures can be determined. To accomplish this objective the burn ash should be sampled and analyzed using one or more of the testing protocols describe below.

The IWMB's Solid Waste Cleanup Program (SWCP) has developed a waste characterization methodology and actively evaluated burn dumps throughout California. The SWCP considers a variety of factors in assessing burn dumps and recommends the following procedures for the waste characterization. The components of the waste characterization include:

1. Developing a sampling plan.
2. Performing discrete sampling following a recommended sampling procedure.
3. Analyzing samples using recommended analytical procedures and testing methodologies.
4. Comparing sampling results with regulatory limits.

The use of SWCP's waste characterization methodology is only a recommendation. Depending on site conditions other city, county, State, or federal agencies may require additional sampling, analyses, and assessments.

#### **Waste Characterization Methodology**

##### ***Sampling Plan***

A sampling plan is necessary to document the procedural and analytical requirements to collect soil samples to characterize areas of potential contamination from a burn dump. The intent of the plan is to provide the necessary documentation to characterize the burn dump ash. At a minimum the plan should discuss: site location and background, project purpose, project tasks, methodology, equipment, sampling procedures and locations, decontamination, sample containers and preservation, disposal of residual materials, analyses of concern, analytical procedures, quality control, chain of custody, and health and safety issues. The number of samples will vary depending on the size, location, and site conditions.

##### ***Sampling Methodology***

The SWCP staff use authoritative discrete sampling to assess the burn ash and surrounding soils. Authoritative sampling is based on the subjective judgement of the investigator regarding the location of potential contamination and serves as a valuable investigative tool in ascertaining if a hazardous substance is or is not present.

### ***Sampling Procedures***

The SWCP uses appropriate sampling, collecting, decontamination, and storage techniques. All environmental samples are sent to a state-certified hazardous waste laboratory for analyses using chain-of-custody protocols.

### ***Testing Protocols***

In a waste characterization study burn ash samples are analyzed using one or more test protocols. Each test protocol produces its own specific type of information for a given range of conditions.

Four test protocols that are widely used are:

**Protocol 1: Totals Test.** The "totals test" is a chemical digestion test developed by the Department of Toxic Substances Control (DTSC) to determine the total amount of a specific constituent in the soil. A sample is digested chemically to obtain its soluble and insoluble fractions. The total of the soluble and insoluble fractions of the sample is then compared to the total threshold limit concentration (TTL). The results of the Totals Test are reported in milligrams per kilogram of sample (mg/kg).

**Protocol 2: Waste Extraction Test (WET).** The WET is a leaching test developed by DTSC. Results of the WET are compared to the Soluble Threshold Limit Concentration (STLC). The WET determines the amount of a specific constituent that can be leached from the soil using a solution designed to simulate landfill leachate. It is therefore a useful test for situations where a soil would be exposed to landfill leachate, such as disposal of ash together with uncombusted organic wastes in a solid waste landfill. However, the WET may not be very representative of the conditions at a site where all organic material has been completely burned. Because of the aggressive nature of the leaching in this test samples may exceed the STLC. The results of the WET are reported in milligrams per liter (mg/l).

**Protocol 3: Toxicity Characteristic Leaching Procedure (TCLP).** The TCLP was developed by the federal Environmental Protection Agency (U.S. EPA) to determine if a waste is a RCRA waste subject to regulation under Subtitle C. The TCLP is a leaching procedure that uses a slightly less aggressive leaching agent than is used by the WET. The TCLP ensures that any volatile constituents present in the sample are collected and measured. However, few volatile constituents are likely to be found in completely combusted burn ash. Therefore, when compared to the WET results it is likely that TCLP results will indicate lower metals concentrations and less elevated levels of volatile constituents. Chromium is one of the few constituents that may be present in higher concentrations in TCLP results than in WET results. Chromium concentrations are higher because the TCLP results do not differentiate between the 3+ and 6+ chrome species, but report the two species combined. In contrast, the WET reports the 3+ and 6+ species separately. The results of the TCLP are reported in milligrams per liter (mg/l). Temperatures reached during open burning are usually not high enough to completely combust all waste materials in the burn ash. Therefore, in a worst case situation, incomplete combustion may create dioxins and other organic compounds.

**Protocol 4: Deionized Water Waste Extraction Test (DI WET).** The DI WET is used to characterize the amount of metals that would leach from ash under the conditions most likely to be encountered at burn dump sites. This test is essentially the same test as the WET, but uses deionized water as the leaching agent. At most burn dump sites the primary liquid that will come in contact with burn ash is water, not landfill leachate. Results of tests done on samples of burn ash from a variety of burn dump sites indicate that very few samples release any metals when tested under the DI WET protocol.

### ***Analytical Procedures***

Typically, all samples are analyzed for California Assessment Manual (CAM) 17 metals using the Totals Test procedure by EPA Method 6010/7000 and pH by EPA Method 9040. Samples (i.e., at least three) with the highest concentration of lead based on the Totals Test are also analyzed for CAM-5 metals using the WET procedure and RCRA Eight Metals using the TCLP. Also, if the WET results for any other



metal not in the CAM-5 analysis exceeds 10 times the STLC regulatory level a separate WET analysis for that metal must be performed. In addition, the IWMB use the highest lead samples and analyze again for lead using the DI WET extraction procedure. Sampling for PCBs, total recoverable petroleum hydrocarbons (TRPH), and semi-volatile organic compounds may be necessary if visual observation or records indicate possible contamination.

At minimum the SWCP staff recommends all soil/ash samples be analyzed for:

- *CAM 17 Metals (Sb, As, Ba, Be, Ce, Cr, Co, Cu, Pb, Hg, Mo, Ni, Se, Ag, Tl, V, Zn) Totals Test, EPA Method 6010/7471*
- *pH, EPA Method 9040*

And the three samples containing the highest lead be analyzed for:

- *CAM 5 Metals (Cd, Cr, Ni, Pb, Zn), WET, EPA Method 6010*
- *TCLP RCRA Metals (Ag, As, Ba, Cd, Cr, Hg, Pb, Se), EPA Method 1311*

Additionally, the LEA may request the following sampling procedures:

- *PCBs, EPA Method 8080*
- *Total Recoverable Petroleum Hydrocarbons (TRPH), EPA Method 418.1*
- *Semi-Volatile Organic Compounds, EPA Method 8270*
- *Lead DI-WET, WET, EPA Method 6010*

In addition, testing for dioxins and furans may be appropriate if evidence suggests that these constituents would likely be present from the type of waste combusted, and/or the site is located in an urban area with a number of sensitive receptors nearby and where there is a higher risk to human health and safety.

### **Regulatory Limits**

To characterize the ash, SWCP staff use regulatory limits established from the California Code of Regulations, Title 22, section 66261.10 et seq. and the Code of Federal Regulations, Title 40, Section 261.24. The sample results are compared to the TTLC and STLC, and the federal RCRA Standards. This comparison provides the basis for classifying the burn ash as either a RCRA hazardous waste, a non-RCRA hazardous waste (designated California hazardous waste), or a non-hazardous solid waste. Burn ash that contains concentrations of metals that exceed the TTLC or STLC limits, or established health based levels that the DTSC has determined to be protective of human health and the environment, may be considered hazardous waste as defined in Title 14, California Code of Regulations, section 17225.32. In addition, wastes that exceed the TCLP concentration limits would be considered a RCRA hazardous waste.

### **Examples of Burn Ash Analytical Test Results in California**

Table 1 shows the highest concentrations from the totals test data of nine common metals found in ash sampled at 12 sites throughout California. These numbers represent the total amount of certain metals that are present in the soil. These results show that ash commonly contains lead in excess of the California standard for hazardous waste, with nickel and zinc also found at elevated levels. Some of the tested sites also showed elevated levels of arsenic and chromium.

Table 2 compares the results of testing of a single sample using the Totals Test, WET, TCLP, and DI WET test protocols. Samples tested under the Totals Test protocol that exceed the TTLC hazardous threshold for lead also will likely exceed the STLC hazardous threshold for lead. However, a sample tested under the TCLP protocol, with its less aggressive leaching agent, will probably not exceed the hazardous threshold concentration associated with the TCLP test. If the sample is tested under the DI WET protocol the sample again probably will not exceed the STLC hazardous threshold concentration limits.



**Table 1****Summary of Highest Totals Test Values of Selected Metals at Burn Dump Sites within California Compared to TTLC Limits**

(Concentrations in excess of DTSC hazardous waste levels shown in bold italics)

(NA = Not Available; ND = Non Detected)

Site Name	As (mg/ kg)	Be (mg/ kg)	Cd (mg/ kg)	Cu (mg/ kg)	Cr (mg/ kg)	Hg (mg/ kg)	Ni (mg/ kg)	Pb (mg/ kg)	Zn (mg/ kg)
Amador City Burn Dump	220	0.77	7.9	1260	101	1.2	102	<b>2180</b>	2240
Davenport Burn Dump	18	0.41	24	502	81	1.42	104	<b>1310</b>	1970
Drum Canyon Burn Dump	204	<b>240</b>	22	670	53	3.6	81	<b>2830</b>	2620
(Old)Grass Valley Burn Dump	16		19		2300	ND	<b>2100</b>	<b>4900</b>	200
Humboldt Road Disposal Site	NA		NA		NA	NA	NA	<b>4920</b>	NA
Los Banos Bottle Dump/Merced Springs Road Burn Dump Site	19.6		7.8		96.8	NA	NA	<b>3750</b>	2200
Morro Bay Burn Dump	14	0.73	16	504	115	0.20	217	<b>6080</b>	1790
Mountain Meadows Illegal Disposal Site	17.5		3.9		85.6	1.5	83.7	<b>1110</b>	3320
Nevada City Burn Dump (A)	NA		12		73	NA	20	<b>2200</b>	<b>5500</b>
Nevada City Burn Dump (B)	ND		11.1		7.08	0.61	39.9	<b>1904</b>	3040
Tehachapi Burn Dump #2	7.1		NA		26.9	<0.1	11.9	16.7	NA
Wilder Ranch Burn Dump	<b>1420</b>	0.32	12.0	496	96	0.09	196	779	<b>5410</b>
<b>Hazardous Waste Level TTLC</b>	<b>500</b>	<b>75</b>	<b>75</b>	<b>2500</b>	<b>2500</b>	<b>20</b>	<b>2000</b>	<b>1000</b>	<b>5000</b>

**Table 2****Comparison of Burn Dump Ash Test Results**

	Lead (Pb)				Cadmium (Cd)				Arsenic (As)				Mercury (Hg)			SAMPLE
Site Name	TTLC	STLC	TCLP	DI WET	TTLC	STLC	TCLP	DI WET	TTLC	STLC	TCLP	DI WET	TTLC	STLC	DI WET	ID
Hazardous Threshold Level	1000	5	5		100	1	1		500	5	5		20	2		
Amador City Burn Dump	2180	26		0.077	7.9	0.35			133				0.32			SS3
	1490	14		0.11	6.5	0.27			155				1.2			SS2
Drum Canyon Burn Dump	2830	74		0.23	18	0.33		ND	204				0.09			2AS
	1660	248		ND	22	0.42		ND	23				0.45			3AS
	966	50		0.15	12	0.42		0.07	10				3.6			4AS
		95	0.82													DCASH1
		61	4.2													DCASH2
		84	0.89													DCASH3
(Old) Grass Valley Burn Dump	4900				19				16				ND			E-1 (2/11/92)
	2980	5.1			12	ND			14	ND			ND	ND		E-2 (2/11/92)
Humboldt Road Burn Dump	4620	104														#I2
	4920	51.9														#F2
	4390			<0.50												#K2-1
Los Banos Bottle Dump/ Mercey Springs Road Dump	1160		<0.5	0.017	5.9		0.059	<0.005	14.2		<0.5	<0.005				PRS*
	1950			0.035	5.6			<0.005	19.6			<0.005				MSRBD**
Hanford School Site	240	33			1				4				0.3			B-3@1FT
	280	4.1			ND				2				0.2			LA-3@1FT
	430	10			ND				4				0.5			B5@1FT
	Lead (Pb)				Cadmium (Cd)				Arsenic (As)				Mercury (Hg)			SAMPLE
Site Name	TTLC	STLC	TCLP	DI WET	TTLC	STLC	TCLP	DI WET	TTLC	STLC	TCLP	DI WET	TTLC	STLC	DI WET	ID
Morro Bay Burn Dump	6080	605		ND	16				14				0.12			1-BA
	1170	46		ND	16				14				0.2			2-BA
Nevada City Burn Dump	1904				11.12				ND				0.61			NCM10
	1000				6.12				ND				0.34			NCM8

TTLC = mg/kg

STLC, TCLP, DI WET =mg/L

ND = below detection limit

\* Composite of 18040, 180421, 18042, 18043

\*\* Composite of 18044, 18045, 18046, 18047

## Attachment 2

### Health Effects of Seven Metals Commonly Found in Burn Ash<sup>1</sup>

#### Arsenic (As)

Arsenic is listed by the Environmental Protection Agency (EPA) as one of 129 priority pollutants.

Arsenic is also listed among the 25 hazardous substances thought to pose the most significant potential threat to human health at priority superfund sites.

**Potential Hazards to Fish, Wildlife, and Other Non-Human Biota:** Plants can take up arsenic in a variety of ways, including from fly ash, sludge, and by manure dumped on the land. However, it has been found that the edible portions of plants grown on contaminated sources seldom accumulate dangerous levels of arsenic. Animals are generally less sensitive to arsenic than plants. Arsenic is one of the most toxic elements to fish.

**Potential Hazards to Humans:** Arsenic has long been a concern to man because small amounts can be toxic to humans. Relatively high doses of arsenic have been reported to cause bone marrow suppression in humans. Inorganic arsenic in high amounts has been known for centuries as a fast acting human poison.

**Brief Summary of Carcinogenicity/Cancer Information:** Arsenic is often thought of as a carcinogenic priority pollutant. Recent reviews indicate arsenic has been implicated in numerous types of cancer, including skin, bladder, kidney, liver, prostate, and nasal cavity.

**Brief Summary of Developmental, Reproductive, Endocrine, and Genotoxicity Information:** Recent reviews indicate arsenic has been associated with genotoxic, fetotoxic, mutagenic, and teratogenic impacts. Arsenic does not seem to directly impact DNA but may inhibit some DNA repair.

#### Beryllium (Be)

Beryllium is listed by the EPA as one of 129 priority pollutants, and is considered one of the 14 most noxious heavy metals.

**General Hazard/Toxicity Summary:** All beryllium compounds are potentially harmful or toxic. However, the probability of beryllium occurring at significantly toxic levels in ambient natural waters is minimal.

**Potential Hazards to Fish, Wildlife, and Other Non-Human Biota:** In those cases in which it is elevated in water beryllium is extremely toxic to warm water fish in soft water.

**Potential Effects of Beryllium Upon Humans:** Human impacts of beryllium include severe lung inflammation. Acute exposure to high concentrations of the more soluble compounds of beryllium can cause chemical pneumonitis, the symptoms of which include cough, substernal burning, shortness of breath, anorexia, and increasing fatigue.

**Brief Summary of Carcinogenicity/Cancer Information:** Beryllium is a Class B2 carcinogen, (i.e., a probable human carcinogen). Beryllium has been shown to induce lung cancer via inhalation in rats and monkeys and to induce osteosarcomas in rabbits.

<sup>1</sup> Information in Attachment 2 was compiled from the following document taken from web site address: [www.aqd.nps.gov/toxic/list.html](http://www.aqd.nps.gov/toxic/list.html) *Environmental Contaminants Encyclopedia*, July 1, 1997, Roy J. Irwin, National Park Service

**Brief Summary of Developmental, Reproductive, Endocrine and Genotoxicity Information:** Beryllium has been shown to be teratogenic in snails, and to cause developmental problems in salamanders. Impacts on humans are unknown.

#### Cadmium (Cd)

Cadmium is listed by the EPA as one of 129 priority pollutants. Cadmium is also listed among the 25 hazardous substances thought to pose the most significant potential threat to human health at priority superfund sites.

**General Hazard/Toxicity Summary:** Cadmium ions are extremely poisonous; their action is similar to those of mercury. Cadmium acts as a cumulative poison. All cadmium compounds are potentially harmful or toxic.

**Potential Hazards to Fish, Wildlife, and Other Non-Human Biota:** Cadmium is very toxic to a variety of species of fish and wildlife. Cadmium causes behavior, growth, and physiological problems in aquatic life at sublethal concentrations. Cadmium is the only metal that clearly accumulates with increasing age of the animal, and the kidneys are the preferred site of cadmium accumulation.

**Potential Effects of Cadmium Upon Humans:** All cadmium compounds are potentially harmful or toxic. It has been implicated as a cause of human deaths. Kidney and/or liver damage have followed respiratory exposures in industry. Inhalation of cadmium dusts, salts, and fumes over a number of years can cause kidney and bone marrow diseases and emphysema.

**Brief Summary of Carcinogenicity/Cancer Information:** Cadmium is listed by EPA as a Class B1 carcinogen (i.e., a probable human carcinogen by inhalation).

**Brief Summary of Developmental, Reproductive, Endocrine and Genotoxicity Information:** Cadmium is listed as having some endocrine disruptive activities. Cadmium has been shown to cause birth defects in mammals.

## **Chromium, General (Cr)**

Chromium (Cr) is listed by the EPA as one of 129 priority pollutants. Chromium is considered one of the 14 most noxious heavy metals. Chromium is also listed among the 25 hazardous substances thought to pose the most significant potential threat to human health at priority superfund sites.

**General Hazard/Toxicity Summary:** The EPA regards all chromium compounds as toxic. Hexavalent chromium causes cellular damage via its role as a strong oxidizing agent, whereas trivalent chromium can inhibit various enzyme systems or react with organic molecules.

**Potential Hazards to Fish, Wildlife, and Other Non-Human Biota:** In plants chromium interferes with uptake translocation and accumulation by plant tops of calcium, potassium, magnesium, phosphorus, boron, copper, and aggravates iron deficiency chlorosis by interfering with iron metabolism. In mammalian species chromium is considered one of the least toxic trace elements, as normal stomach pH converts hexavalent chromium to trivalent chromium.

**Potential Hazards to Humans:** Hexavalent chromium is associated with cancer risk and kidney damage. Certain hexavalent chromium compounds when administered via inhalation at high doses have the potential to induce lung tumors in humans and experimental animals. However, at low levels of exposure hexavalent chromium ions are reduced in humans bodily.

**Brief Summary of Carcinogenicity/Cancer Information:** Chromium in general is listed by EPA as a Class A human carcinogen. Some salts of chromium are carcinogenic and humans exposed to chromium fumes have an increased risk for lung cancer.

**Brief Summary of Developmental, Reproductive, Endocrine, and Genotoxicity Information:** Hexavalent chromium is associated with cancer risk and kidney damage, and may cause damage to DNA and many other tissue structures.

## **Copper (Cu)**

Copper is listed by the EPA as one of 129 priority pollutants.

**General Hazard/Toxicity Summary:** Although copper in water is a hazard to many aquatic organisms minute amounts of copper in the diet are needed for human, plant, and animal enzymes.

**Potential Hazards to Fish, Wildlife, and Other Non-Human Biota:** Elevated concentrations of copper in water are particularly toxic to many species of algae, bacilli, fungi, crustaceans, annelids, cyprinids, and salmonids. Most adult fish are able to tolerate relatively high concentrations of copper for short periods of time. The critical effect of copper is its greater toxicity to younger fish.

**Potential Hazards to Humans:** Copper poisoning or deficiency problems are rare in humans.

**Brief Summary of Carcinogenicity/Cancer Information:** Copper is not classifiable as to human carcinogenicity. There is inadequate animal carcinogenicity data on copper.

***Brief Summary of Developmental, Reproductive, Endocrine, and Genotoxicity Information:***

Reproductive effects on animals are noted at low levels of copper. Incubation of human spermatozoa with metallic copper is found to bring about a significant fall in the percentage of motile sperm in humans.

**Lead (Pb)**

Lead is listed by the EPA as one of 129 priority pollutants. Lead is also listed among the 25 hazardous substances thought to pose the most significant potential threat to human health at priority superfund sites.

***General Hazard/Toxicity Summary:*** All measured effects of lead on living organisms are adverse, including those related to survival, growth, learning, reproduction, development, behavior, and metabolism.

***Potential Hazards to Fish, Wildlife, and Other Non-Human Biota:*** Lead is a heavy metal that is very toxic to aquatic organisms, especially fish. In fish lead deposits in active calcification areas such as scales, fin rays, vertebrae, and opercula. In vertebrates sublethal lead poisoning is characterized by neurological problems, kidney dysfunction, enzyme inhibition, and anemia.

***Potential Hazards to Humans:*** Lead poisoning is particularly dangerous in young children (who may ingest lead by eating lead-containing chips of paint); it may result in anorexia and--in severe cases--permanent brain damage. Women in the workplace are more likely to experience adverse effects from lead exposure than men because their hematopoietic system is more lead sensitive than men's.

***Brief Summary of Carcinogenicity/Cancer Information:*** Lead is listed by EPA as a Class B2 carcinogen. There is sufficient evidence to be classed as an animal carcinogen.

***Brief Summary of Developmental, Reproductive, Endocrine, and Genotoxicity Information:*** Adverse effects of lead on living organisms include those negatively affecting reproduction and development. Effects of sublethal concentrations of lead include delayed embryonic development, suppressed reproduction, inhibition of growth, and fin erosion.

### **Mercury (Hg)**

Mercury is listed by the EPA as one of 129 priority pollutants.

***General Hazard/Toxicity Summary:*** Major sources to atmosphere include incineration of municipal waste, landfills, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA) sites, sewage sludge burning, and medical waste incinerators.

***Potential Hazards to Fish, Wildlife, Invertebrates, Plants, and Other Non-Human Biota:*** Mercury is one of the few metals which strongly bioconcentrates and biomagnifies and has only harmful effects with no useful physiological functions when present in fish and wildlife. The most sensitive target of low-level exposure to metallic or organic mercury following short- or long-term exposures appear to be the nervous system. The most sensitive target of low-level exposure to inorganic mercury appears to be the kidneys.

***Potential Hazards to Humans:*** Human exposure to methyl mercury is almost entirely due to consumption of fish. Potential impacts to human health are real and potentially great. Mercury deposits in human kidneys may lead to renal failure. Children and persons with a history of allergies or known sensitization to mercury, chronic respiratory disease, nervous system disorders, or kidney disorders are at increased risk to mercury poisoning. Many mercury compounds are irritating to skin and may produce dermatitis with or without vesication. Contact with eyes cause ulceration of conjunctiva and cornea. Mercury deposits in the brain cause many disorders and sometimes dementia in humans.

***Brief Summary of Carcinogenicity/Cancer Information:*** Mercury is not classifiable as to human carcinogenicity, based on inadequate human and animal data.

***Brief Summary of Developmental, Reproductive, Endocrine, and Genotoxicity Information:*** Methyl mercury can denature DNA and can otherwise interact with both DNA and RNA to alter their structures.

### **Nickel (Ni)**

Nickel is listed by the EPA as one of 129 priority pollutants, and is considered to be one of the 14 most noxious heavy metals. Nickel is also listed among the 25 hazardous substances thought to pose the most significant potential threat to human health at priority superfund sites.

***General Hazard/Toxicity Summary:*** Low absorption from the GI tract causes nickel compounds to be essentially nontoxic after ingestion.

***Potential Hazards to Fish, Wildlife, Invertebrates, Plants, or Other Non-Human Biota:*** Mixtures of nickel, copper, and zinc produced additive toxicity effects on rainbow trout.

***Potential Hazards to Humans:*** Nickel is toxic to humans as a dust or powder. The organs that are affected by exposure to nickel, metal, and soluble compounds (as Ni) are nasal cavities, lungs, and skin.

***Brief Summary of Carcinogenicity/Cancer Information:*** Nickel, in general, is not considered a carcinogen.

***Brief Summary of Developmental, Reproductive, Endocrine, and Genotoxicity Information:*** Study results indicate that nickel is a developmental toxicant in animals, but it is not known whether occupational or environmental exposure to nickel could result in developmental effects in humans.

### **Zinc (Zn)**

Zinc is listed by the EPA as one of 129 priority pollutants.

***General Hazard/Toxicity Summary:*** Zinc in low to moderate amounts is of very low toxicity in its ordinary compounds and in low concentrations is an essential element in plant and animal life.

***Potential Hazards to Fish, Wildlife, Invertebrates, Plants, or Other Non-Human Biota:*** Elevated concentrations of zinc in water are particularly toxic to many species of algae, crustaceans, and salmonids. In mammals excess zinc can cause copper deficiencies, affect iron metabolism, and interact with the chemical dynamics of lead and drugs.

***Potential Hazards to Humans:*** In humans, prolonged excessive dietary intake of zinc can lead to deficiencies in iron and copper, nausea, vomiting, fever, headache, tiredness, and abdominal pain. Zinc is a human skin irritant.

***Brief Summary of Carcinogenicity/Cancer Information:*** There are no reports on the possible carcinogenicity of zinc and compounds per se in humans.

***Brief Summary of Developmental, Reproductive, Endocrine, and Genotoxicity Information:*** The risk associated with maternal ingestion of large amounts of zinc in human pregnancy is unknown.



## Attachment 3

### Procedures to Follow When Remediating Burn Dumps

The four scenarios that will typically be encountered when regulating burn dumps are:

5. Minimal action required.
6. Leave burn ash in place and cap.
7. Consolidate burn ash on site or on another adjacent parcel that already contains burn ash and cap.
8. Clean closure of the burn dump site.

#### **Scenario 1, Minimal Action Required**

*(Refer to Figure A, "Leave Ash in Place with Minimal Action Required")*

Under this scenario a determination is made through the Site Investigation Process (SIP) that at the site in question there is no exposed burn ash, no proposed postclosure land use (PCLU), and that the current land use does not pose an immediate threat to public health and safety and the environment. If the site is located in an area that is accessible to the public the owner may be required to fence and post the site to limit access and to warn the public that a burn dump is present. For sites that fit this scenario there would likely be no other mitigation measures or actions proposed for managing the burn ash at the site. The procedure shown on Figure A would then be followed.

Generally, waste characterization will not be required for sites under this scenario because there are no proposed actions at the site. In the future, if site conditions were to change (e.g., erosion of the cover or PCLU), waste characterization may be warranted.

The primary concerns for sites that fit this scenario are changes in site conditions that might pose a threat to public health and safety and the environment or changes in land use. The following actions can be taken to identify and minimize the risk of such changes:

- A determination should be made of whether erosion control is needed to protect the cover at the site.
- If it has not already been done the Local Enforcement Agency (LEA) should determine whether the owner should provide site security and limit public access by fencing the site and posting a sign warning the public that a burn dump is present. This determination should be based on current relative risk to human health and safety and the environment (e.g., increase in adjacent population).
- The owner should be notified in writing by the LEA that future development of the property will be subject to the PCLU requirements contained in California Code of
- Regulations, Title 27 (27 CCR), section 21190 and that any proposed change in land use must be approved by the appropriate regulatory agencies.
- A deed notification or restriction should be placed on the title of the property to limit the types of PCLU that are allowed on the site and to also notify the appropriate agencies when a PCLU is being proposed for construction on the site. A deed restriction will also notify prospective buyers that the property contains a burn dump and the buyer will assume all responsibility for managing it should they purchase the property. Lastly, it would require that the owner notify the LEA of changes in ownership. The procedure to follow in recording a typical deed restriction for a burn dump is contained in Attachment 4..

#### **Scenario 2, Leave Burn Ash in Place and Cap**

*(Refer to Figure B, "Leave Ash in Place and Cap")*

Under this scenario it has been determined through the SIP process that there is exposed burn ash or potential exposure of burn ash at the site in question but no proposed PCLU. The primary human health threat associated with burn dump sites under this scenario is exposure through direct contact with the burn ash or exposure to windblown particulates that have been contaminated with burn ash. Therefore, the best mitigation might be to simply cap the exposed burn ash. The procedure shown on Figure B should be followed to mitigate the sites that fit this scenario.



The first step under this scenario is to determine whether the site poses an immediate threat to public health and safety and the environment. To determine the immediate threat to public health and safety and the environment the owner is required to perform waste characterization on the burn ash material. To ensure a proper waste characterization the owner should submit a waste characterization workplan to the LEA for approval. Waste characterization is necessary to define the limits of the waste and to determine whether the waste is hazardous. This information will ensure that all exposed burn ash is properly capped and that appropriate measures are incorporated into the site health and safety plan and properly implemented during the capping activities.

A waste characterization of the burn ash will likely show that it is a hazardous waste and would therefore be subject to the hazardous waste regulations and Department of Toxic Substances Control (DTSC) oversight and approval. However, in a memorandum dated March 3, 1995, DTSC states that if there is no active management of the burn ash material (i.e., the burn ash will be left in place and capped) the "...regulations regarding the management of hazardous waste do not apply". In other words, DTSC does not require that the owner of the burn dump site obtain DTSC approval of on-site activities to consolidate and cover the ash, nor is the owner required to obtain a DTSC variance in order for the LEA to oversee these capping activities.

It should be noted that even though DTSC has made the policy decision that the burn ash does not need to be managed as a hazardous waste under this scenario, the LEA must still make the necessary notifications as required under the Safe Drinking Water & Toxic Enforcement Act of 1986 (Proposition 65), Health and Safety Code sections 25249.5 et. seq.

In the event that the analyses show that the burn ash cannot be classified as a hazardous waste DTSC coordination would not be necessary. Regardless of whether the waste is hazardous or not, the LEA should coordinate with the Regional Water Quality Control Board (RWQCB).

After the burn dump site is capped (e.g., covered with two feet of compacted earthen material) the owner should provide site security (e.g., fencing and posting the area where burn ash remains). This will limit public access to the site.

Next, a deed notification or restriction should be placed on the title of the property to limit the types of PCLU that can be constructed on the site and to also notify the appropriate agencies when a PCLU is being proposed for construction on the site. It will also notify any prospective buyers that the property contains a burn dump and the buyer will assume all responsibility for managing it should they purchase the property. Lastly, it would require that the owner notify the LEA of changes in ownership. The procedure to follow in recording a typical deed restriction for a burn dump is contained in Attachment 4. Lastly, the LEA should notify DTSC of the location and actions taken at the burn dump site and should also continue to monitor the site for illegal dumping, PCLU, or erosion of the cap.

### **Scenario 3, Consolidate Burn Ash on Site or on a Contiguous Parcel That Already Contains Burn Ash**

*(Refer to Figure C, "Consolidate Ash, Either On Site or on a Contiguous Parcel that Already Contains Ash")*

Under this scenario there are multiple burn dump sites on one property or the burn ash is shallow and spread over a large area. There may or may not be exposed burn ash on the site. There is no existing or proposed PCLU that would pose a threat to public health and safety and environment. Under these conditions one possible mitigation would be to consolidate these sites into fewer sites or even one site. The primary human health threat associated with burn dump sites is exposure through direct contact with the burn ash or exposure to windblown particulates that have been contaminated with burn ash. Therefore, appropriate health and safety measures should be implemented during excavation and movement of the burn ash material. If the owner does not want to develop the property the site can be remediated in place and maintained by the owner. The procedure shown on Figure C should be followed.

Because the burn ash will be excavated and moved under this scenario a waste characterization is necessary to define the limits of the waste and to determine whether the waste is hazardous. This information will ensure that 1) all exposed burn ash is identified and properly capped, and 2) appropriate measures are incorporated into the site health and safety plan and are properly implemented.

A waste characterization of the burn ash will likely show that it is a hazardous waste. However, as long as the burn ash material is only moved and consolidated on site or onto a contiguous pre-contaminated parcel DTSC would not consider this active management of hazardous waste. Therefore, the hazardous waste regulations would not apply under this scenario and the LEA could use 27 CCR regulations to regulate these sites. As stated previously in Scenario 2 the LEA must still make the necessary notifications as required under Proposition 65.

Since excavation of the burn ash will occur during the consolidation of the burn dump sites, the excavation activities should follow guidance contained in LEA Advisory Number 26, Excavation Permit. Lastly, the purpose of consolidation of one or more burn dumps is clean closure of the portions of the site from which burn ash is removed. Therefore, guidance contained in LEA Advisory Number 16, Clean Closure, is recommended to be followed to ensure that the clean closure is complete and documented. Once the consolidation activities are complete the burn ash can be covered with at least two feet of earthen material and graded to drain. If the finished grades are relatively steep the owner should provide erosion protection. In many cases more than two feet of cover material are necessary. The owner should also provide confirmation sampling of the "clean closed" areas to verify all burn ash materials have been removed.

After the burn ash is capped the owner should provide site security to limit public access (e.g., fencing and posting the area where burn ash remains).

Next, a deed notification or restriction should be placed on the title of the property to limit the types of PCLU that can be constructed on the site and to also notify the appropriate agencies when a PCLU is being proposed for construction on the site. The deed notification or restriction will also notify any prospective buyers that the property contains a burn dump and the buyer will assume all responsibility for managing it should they purchase the property. It would require that the owner notify the LEA of changes in ownership. The procedure to follow in recording a typical deed restriction for a burn dump is contained in Attachment 4.

Lastly, the LEA should notify DTSC of the location and actions taken at the site and they should also continue to monitor the site for illegal dumping, PCLU, or erosion of the cap.

#### **Scenario 4, Clean Closure**

*(Refer to Figure D, "Clean Closure for a Site that Contains Ash")*

Under this scenario the burn dump site, or a portion of the site if consolidation has occurred, will be clean closed. This means that all the burn ash at the site is removed and transported off-site to an appropriate disposal site.

The primary human health threat associated with burn dump sites is exposure through direct contact with the burn ash or exposure to windblown particulates that have been contaminated with burn ash. Therefore, appropriate health and safety measures should be implemented during excavation of the ash material. The procedure shown on Figure D should be followed for sites that fit this scenario.

Since the burn ash will be excavated and moved waste characterization is necessary to determine the proper disposal site for the burn ash and to also ensure that appropriate measures are incorporated into a health and safety plan and properly implemented during the excavation of the burn ash material.

A waste characterization of the burn ash will likely show that it is a hazardous waste. But as long as the waste is not a Resource Conservation and Recovery Act (RCRA) hazardous waste and passes the Deionized Water Waste Extraction Test (DI WET) it can be regulated using 27 CCR regulations.

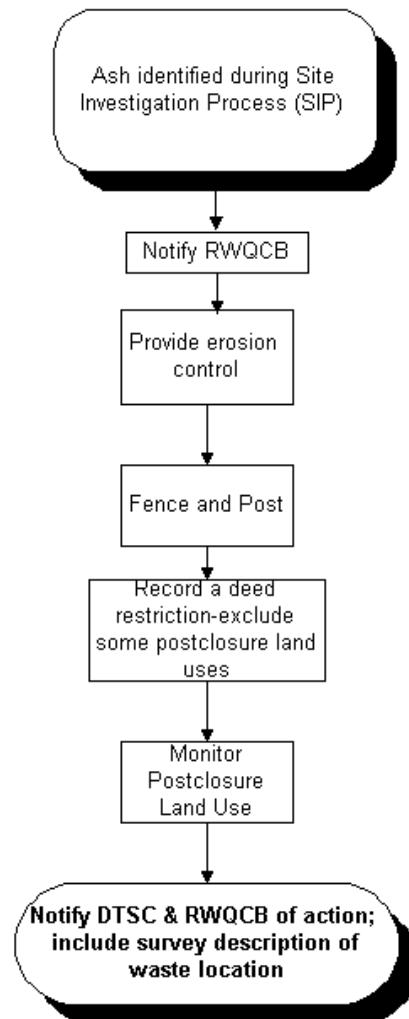
However, the LEA must still make the necessary notifications as required under Proposition 65. Also, as stated in a memorandum dated March 3, 1995, DTSC must first issue a variance for the burn ash before it is allowed to be disposed of at a non-Class I disposal facility.

Guidance contained in LEA Advisory Number 16, Clean Closure, should be followed to ensure clean closure is complete and documented.

Also, once clean closure of the burn dump site is achieved and certified clean by the LEA, DTSC, and the RWQCB the owner would be free to develop the site without any additional land use restrictions or postclosure maintenance requirements.

**Figure A**  
**Leave Ash in Place with Minimal Action Required**

June 29, 1998

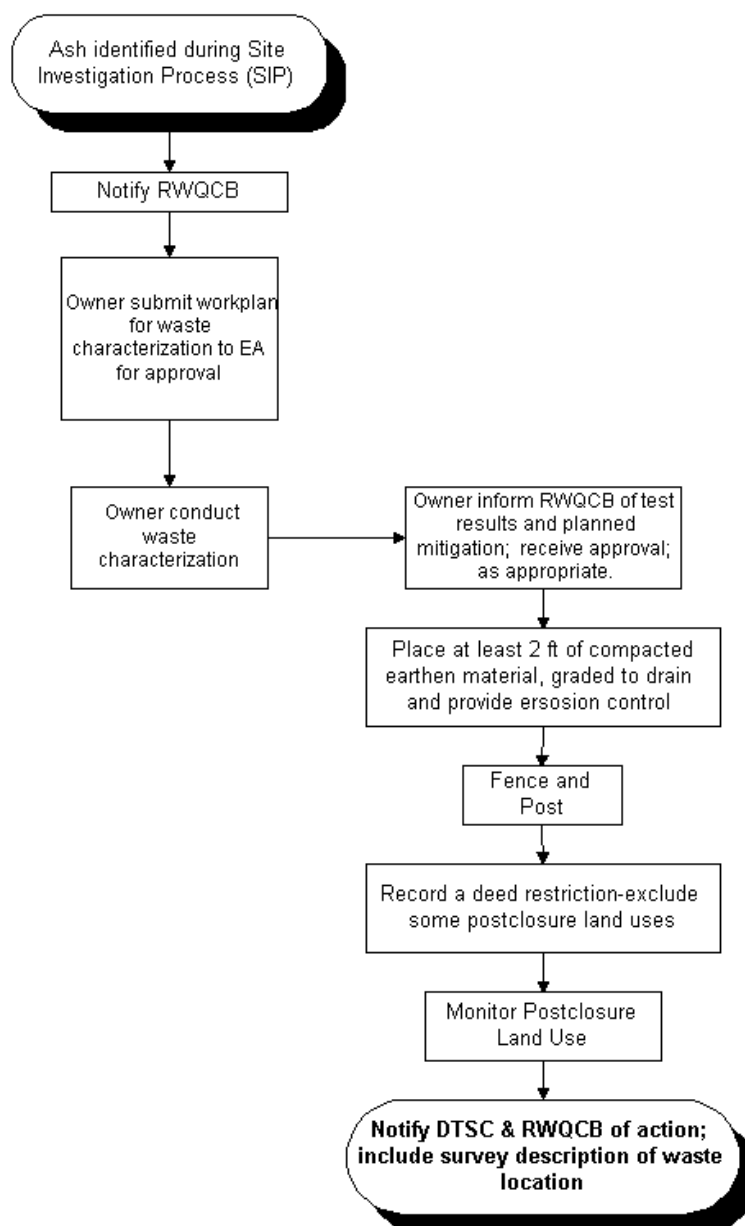


**Notes:**

- No Characterization required since there is no exposed ash
- The initial CEQA document, if necessary, will be drafted either to reflect burn ash remediation, if burn ash is known to be on site, or to incorporate the possibility that burn ash may be discovered during remediation activities.
- The health and safety plan for the remediation will be drafted either to reflect appropriate precautions for burn ash handling, if burn ash is known to be on site, or will be revised to incorporate appropriate precautions once burn ash is discovered.
- The intended PCLU is nonirrigated open space. If another PCLU is intended, the site owner must notify the regulatory agencies (DTSC, RWQCB, and LEA).

**Figure B**  
**Leave Ash in Place and Cap**

July 3, 1998



**Notes:**

-The initial CEQA document, if necessary, will be drafted either to reflect burn ash remediation, if burn ash is known to be on site, or to incorporate the possibility that burn ash may be discovered during remediation activities.

-The health and safety plan for the remediation will be drafted either to reflect appropriate precautions for burn ash handling, if burn ash is known to be on site, or will be revised to incorporate appropriate precautions once burn ash is discovered.

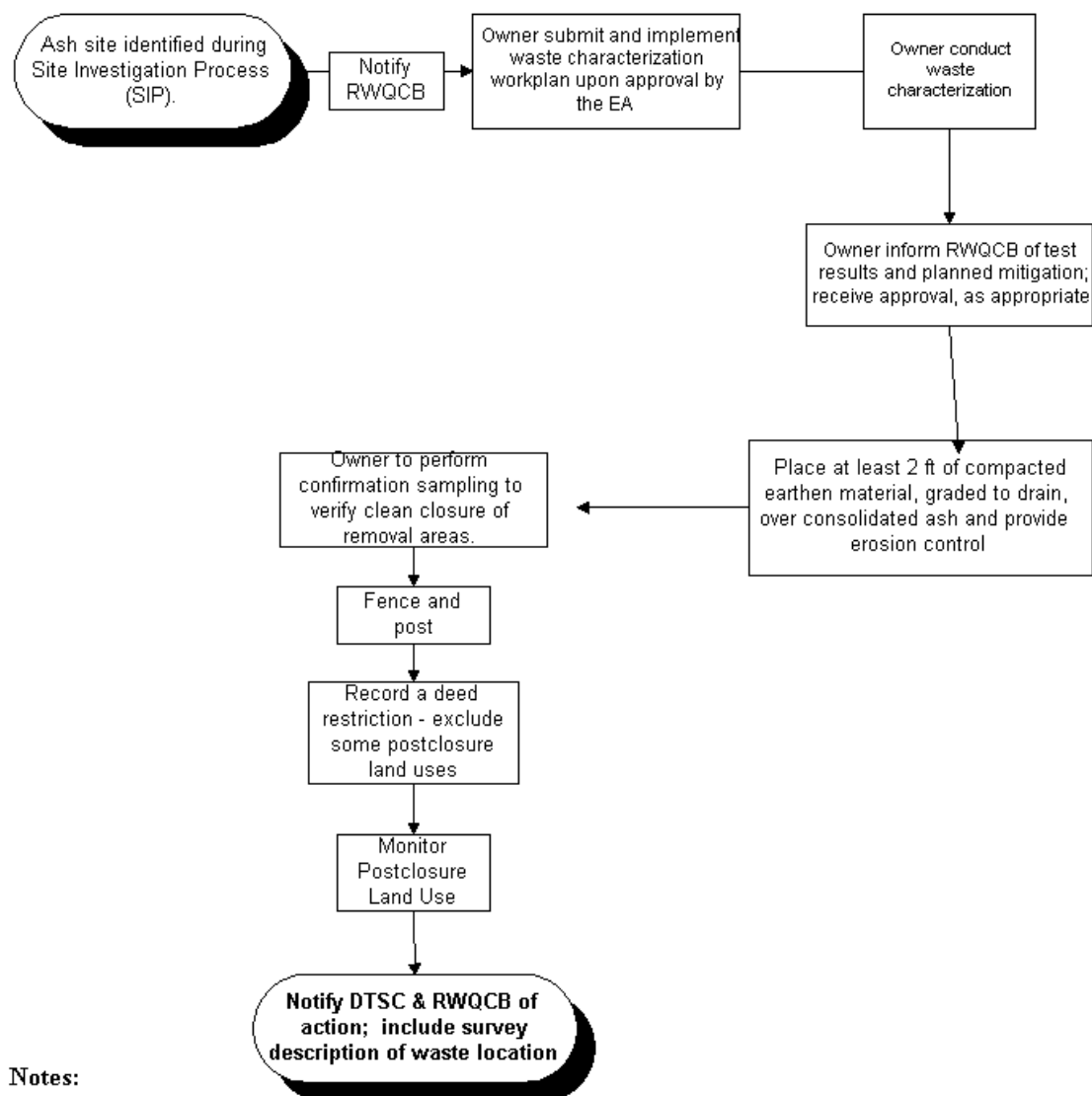
-The intended postclosure land use is nonirrigated open space. If another PCLU is intended, the site owner must notify the regulatory agencies (DTSC, RWQCB, and LEA).

-The LEA will perform Proposition 65 notification on receipt of TTLC, STLC, or TCLP results, if necessary.

A3-6

**Figure C**  
**Consolidate Ash, Either on Site or on a**  
**Contiguous Parcel that Already Contains Ash**

July, 3, 1998



**Notes:**

-The initial CEQA document, if necessary, will be drafted either to reflect burn ash remediation, if burn ash is known to be on site, or to incorporate the possibility that burn ash may be discovered during remediation activities.

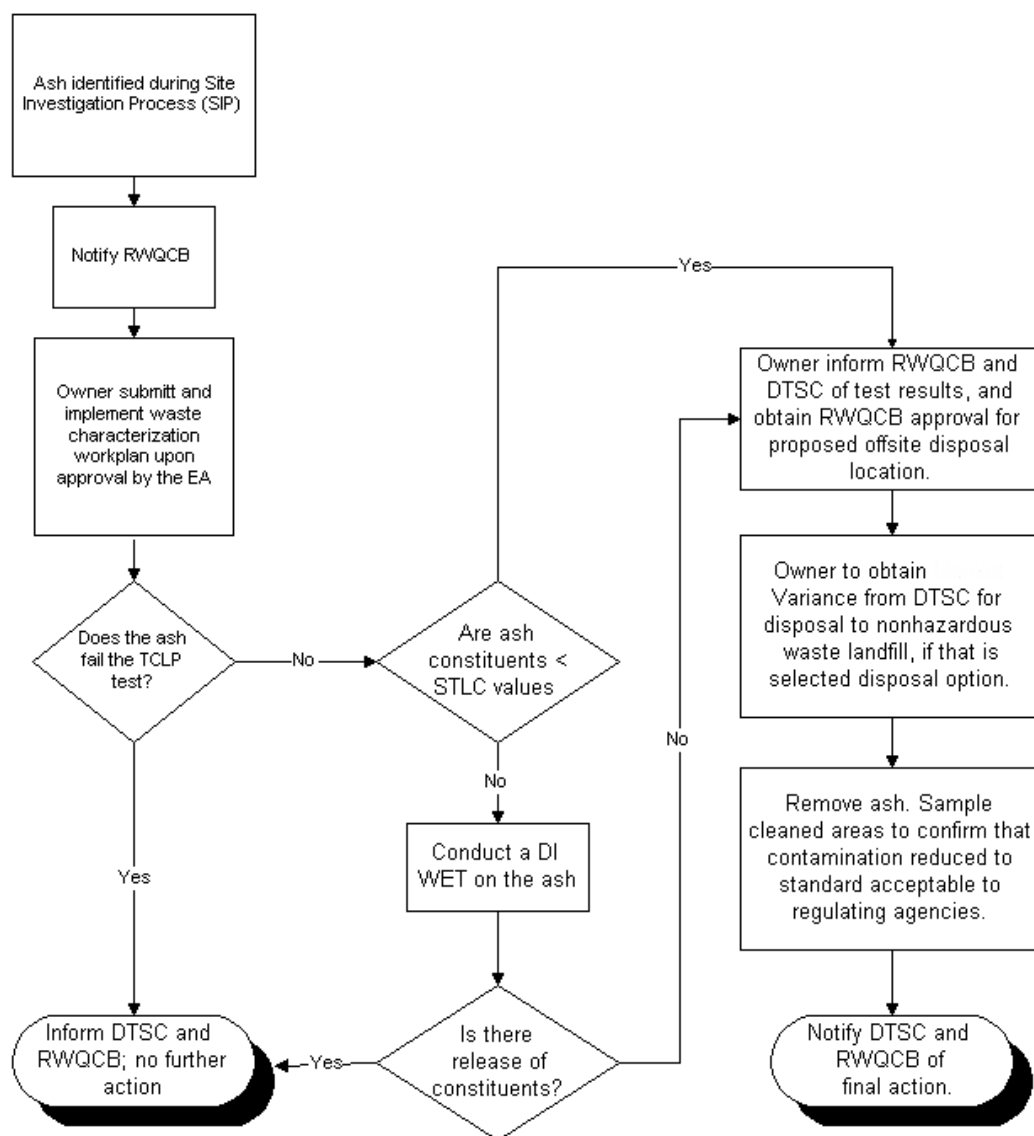
- The health and safety plan for the remediation will be drafted either to reflect appropriate precautions for burn ash handling, if burn ash is known to be on site, or will be revised to incorporate appropriate precautions once burn ash is discovered.

- The intended postclosure land use is nonirrigated open space. If another PCLU is intended, the site owner must notify the regulatory agencies (DTSC, RWQCB, and LEA).

- The LEA will perform Proposition 65 notification on receipt of TTLC, STLC, or TCLP results, if necessary.

July 3, 1998

**Figure D**  
**Clean Closure for a site that contains ash**



**Notes:**

- The initial CEQA document, if necessary, will be drafted either to reflect burn ash remediation, if burn ash is known to be on site, or to incorporate the possibility that burn ash may be discovered during remediation activities.

- The health and safety plan for the remediation will be drafted either to reflect appropriate precautions for burn ash handling, if burn ash is known to be on site, or will be revised to incorporate appropriate precautions once burn ash is discovered.

- The LEA will perform Proposition 65 notification on receipt of TTLC, STLC, or TCLP results, if necessary.

## Attachment 4

### Recording Deed Restrictions for Burn Dumps Remediated in Place

Section 25220 of the Health and Safety Code is used by the Department of Toxic Substances Control (DTSC) for recording restrictions for hazardous waste sites and section 21170 of Title 27 of the California Code of Regulations (27 CCR) is used by Local Enforcement Agencies (LEA) for recording deed restrictions for landfills. Based on procedures in these sections and the procedures contained in this advisory the following guidelines have been developed for remediation of burn dumps in place and recording deed restrictions.

#### Site Investigation

- Obtain the assessor's parcel number, address, legal description of the parcel, owner's name and address, and a boundary survey map.
- Determine the extent, thickness, and constituents of the burn ash. (Use existing investigations and/or perform field surveying, drilling, sampling and analysis.)
- Prepare a record map that includes boundary survey information (or modify the existing boundary survey map). Map scale should not be more than 1"=200'. Show the existing areas of burn ash tied to property boundaries and provide topographical/drainage information on and around the site needed to estimate grading and construction permit requirements.
- Note the assessor's parcel number on the record map.
- Incorporate the above information and map in the Site Investigation Report.

#### Construction Completion

- Update the Record Map to show the as-built location of the burn ash tied to property boundaries, type and thickness of the soil cover, final topography and drainage (including new/modified drainage structures), fencing plan and type, and other pertinent details.
- Include on the Record Map the date of remediation and a brief summary of remediation performed (e.g., tons of solid waste recycled or landfilled, description of burn dump remediation, erosion control, and fencing).
- Make known on the Record Map the hazardous properties of the burn ash and the postclosure land use (PCLU) restrictions necessary to maintain the integrity of the soil cover. For example, the following language might be used if the burn ash is classified as a hazardous waste:

The covered burn ash contains metal substances classified as hazardous in California Code of Regulations, Title 22 (see *[fill in the name of the Report]* dated *[fill in the date]* for laboratory analysis of burn ash). Postclosure land use shall be restricted to activities that will not result in penetration of the soil cover or exposure of the burn ash (e.g., non-irrigated open space), and shall exclude construction of buildings and structures over the burn dump area. Proposed land uses that violate these restrictions shall require the proponent to apply to the *[fill in the name of the Local Enforcement Agency]* for removal of land use restrictions, and to the Department of Toxic Substances Control for a variance or removal of land use restrictions pursuant to section 25233 or 25234 of the California Health and Safety Code.

If the burn ash is classified as a non-hazardous waste the following language might be used:

The covered burn ash contains metal substances classified as non-hazardous in California Code of Regulations, Title 22 (see *[fill in the name of the Report]* dated *[fill in the date]* for laboratory analysis of burn ash). Postclosure land use shall be restricted to activities that will not result in penetration of the soil cover or exposure of the burn ash (e.g., non-irrigated open space), and shall exclude construction of buildings

and structures over the burn dump area. Proposed land uses that violate these restrictions shall require the proponent to apply to the [fill in the name of the Local Enforcement Agency] for a removal of land use restrictions.

- Notify the appropriate city/county planning and building department to file the Record Map and require any proponent requesting a land use differing from the filed PCLU to apply to DTSC.
- Include a copy of the notification to the Planning and Building Department and the Record Map in the Construction Completion Report.



## Attachment 5


Attachment

STATE OF CALIFORNIA - CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

100 F STREET, 4TH FLOOR  
SACRAMENTO, CA 95833  
(916) 324-7193

PTC 00000000



## MEMORANDUM

TO: *Doug* Doug Okumura, Deputy Director  
Permitting and Enforcement Division  
California Integrated Waste Management Board  
8800 Cal Center Drive  
Sacramento, CA 95825

FROM: *John M. Kuntz* John M. Kuntz, Deputy Director  
Hazardous Waste Management Program

DATE: March 3, 1993

SUBJECT: REGULATION OF BURN DUMP ASH

This memo is in response to your memo concerning the regulation of burn dump ash. In your memo, you outline two categories of problems that you anticipate encountering when dealing with burn dump ash during remediation under the AB 2136 program: remediation of sites known to contain burn dump ash and remediation of ash found unexpectedly during clean-up of a site. In your memo, you express uncertainty regarding the position of the Department of Toxic Substances Control (DTSC) relative to regulation of burn ash sites. We hope that our response to your memo will clearly lay out options for the California Integrated Waste Management Board (CIWMB) during remediation of burn ash sites.

Your memo includes three flow charts that DTSC understands are meant to represent how CIWMB thinks coordination between DTSC and CIWMB for various waste management scenarios should be accomplished in order to keep the CIWMB burn dump ash projects on schedule. The first flow chart addresses leaving the ash in place and capping the burn ash area. Since no active management of the burn ash will occur under this scenario, the regulations regarding the management of hazardous waste do not apply. No permitting action from DTSC is necessary; however, in order to provide some assurance that the remaining ash does not pose a threat, we recommend that incompatible land uses be precluded from areas containing ash. For example, your flow chart shows a one-foot compacted earthen cap, fencing, and posting, plus deed restrictions. One foot of cap, depending on its design, may not be adequate. Restrictions prohibiting vegetable gardens, swimming pools, or other land uses should be in place. Roadways,

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Doug Okumura  
March 1, 1993  
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open areas, parking, or commercial land uses are preferred over residential uses for these reasons. Generally, with these precautions in place, DTSC involvement should not be necessary.

The second flow chart addresses consolidating ash, either on site or on a contiguous parcel that already contains ash. Burn ash that is moved within an area that is considered an area of contamination does not constitute active management; therefore, hazardous waste management requirements do not apply. For clarification, an area of contamination is an area of contiguously contaminated soil. The contaminants and the concentrations of the contaminants may vary. A variance from DTSC is not required for movement of burn ash within the area of contamination.

The third flow chart addresses clean closure for a site that contains ash. This flow chart would also apply for sites where the ash cannot be maintained within the area of contamination. CIWMB will not need to obtain a variance from DTSC if the ash does not fail the Total Threshold Limit Concentration (TTLC) or the Soluble Threshold Limit Concentration (STLC) using the Waste Extraction Test (WET), assuming the ash does not fail any other hazardous waste criteria. DTSC needs to issue a variance for ash that must be removed from the area of contamination that fails either the STLC or the TTLC using the WET if (1) CIWMB wishes to use de-ionized water as the extracting solution in order to determine if the ash is nonhazardous and may be disposed in a monofill, or (2) CIWMB wishes to dispose the ash that fails the hazardous waste criteria using the WET in a non-Class I disposal facility. DTSC cannot issue a "blanket variance"; however, CIWMB can request a variance from DTSC for multiple sites where it is known that the ash will need to be removed from the area of contamination. DTSC staff can work with CIWMB to structure a variance that meets the needs of CIWMB to the extent possible.

In your memo you state that there has been no evidence of any burn dump ash exceeding the RCRA hazardous waste criteria. The above discussion assumes that the burn dump ash is not a RCRA hazardous waste. DTSC does not have the jurisdiction to issue a variance from the RCRA hazardous waste requirements.

DTSC suggests, as you note in your flow charts, that a deed restriction and monitoring of post-closure land use be implemented for any ash left in place and capped. One alternative might be that, based on a characterization of the burn dump ash, DTSC can perform a health risk assessment of the

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burn dump ash. Depending on the results of the health risk assessment, disposal or leaving in place of the ash that doesn't exceed the health-based concentrations could be allowed without a deed restriction or monitoring of post-closure land use.

For your information, a copy of the Interagency Agreement between DTSC and Caltrans is attached. The intent of this interagency agreement is to establish a mechanism for Caltrans to provide funding to DTSC for DTSC to provide professional staff services to Caltrans.

Please feel free to call either Watson Gin, Chief of the Permitting Division, at 322-1501 or Peggy Harris, Chief of the Standardized Permitting Section, at 324-7663 if you have any questions.

Attachment

cc: Paul Blais  
Special Assistant to the Secretary  
California Environmental Protection Agency

Stan Phillippe  
Acting Deputy Director  
Site Mitigation Program

Watson Gin, P.E., Chief  
Permitting Division  
Hazardous Waste Management Program

Peggy Harris, P.E., Chief  
Standardized Permitting Section  
Permitting Division  
Hazardous Waste Management Program

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X

**IV. INTERIM GUIDANCE ON REQUIRED CLEANUP AT LOW RISK FUEL  
CONTAMINATED SITES, APRIL 1, 1996**

STATE OF CALIFORNIA - CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

PETE WILSON, Governor

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD****SAN DIEGO REGION**

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April 1, 1996

**MEMORANDUM**

**To: UST Local Oversight Program Agencies and Other Interested Parties Overseeing UST Cleanup**

**Subject: Regional Board Supplemental Instructions to State Water Board December 8, 1995, Interim Guidance on Required Cleanup at Low-Risk Fuel Contaminated Sites (Replaces February 29, 1996 version)**

This supplemental guidance is intended for the regulatory and technical audience<sup>1</sup> to expand on the interim guidance provided in the December 8, 1995, letter from Mr. Walt Pettit, Executive Director of the State Water Resources Control Board regarding the findings of the report entitled "Recommendations to Improve the Cleanup Process for California's Leaking Underground Fuel Tanks (LUFTs)" issued by the Lawrence Livermore National Laboratory (LLNL). Mr. Pettit's letter urges cleanup agencies to proceed aggressively to close low risk soil only cases and not to require active remediation of low risk groundwater cases.

The LLNL report concludes that natural attenuation of petroleum is an important factor in stabilizing plumes and may be the only remedial activity necessary in the absence of the source. After a review of existing literature, white papers submitted to the SB1764 committee, and a study of selected UST leak cases primarily from Coastal Range sedimentary or valley alluvium hydrogeochemical provinces, the LLNL report found that petroleum plumes tend to stabilize close to the source, generally occur in shallow groundwater and rarely impact drinking water wells in the state.

It is in light of these findings and the "lessons learned" over the past ten years in San Diego Region that the attached supplemental Interim Guidance was developed. This interim guidance document describes what constitutes a "low risk soils only case" and "low risk groundwater case". Strategies are presented for closing "low risk soil only cases" and managing "low risk groundwater impact cases" through natural attenuation as the preferred remedial alternative.

These two classes of sites, low risk soils and low risk ground water, are not intended to include the whole universe of petroleum contaminated sites. There are higher risk sites that may require immediate action and active remediation to protect human health and the environment. The responsibility still lies with the responsible party for investigation of the subsurface to gather the data necessary to make these decisions. It remains the responsibility of the regulator to request that information which is required to make the necessary regulatory decisions regarding the site.

<sup>1</sup> Additional information is also provided from the Regional Board in the form of a Fact Sheet in a "Question and Answer" format.

**San Diego Regional Board  
UST Interim Guidance**

**2**

**April 1, 1996**

**It is the responsibility of everyone in the process, particularly consultants and regulators, to keep up with current research on site investigation, fate and transport of contaminants, analytical methods, and other topics that affect the decision making process. Training and education should be a high priority for all parties participating in the site cleanup process. The State and Regional Boards will be providing guidance to the local agencies and others affected.**

## ***INTRODUCTION***

Subsurface conditions are highly variable and there is always some uncertainty associated with evaluating data for a site. However, the cost of obtaining additional site assessment data must be weighed against the benefit from obtaining that additional data and the effect the data may have on the certainty of decisions made for the site.

The following RWQCB guidance concerning the investigation and management of "low risk" leaking petroleum underground storage tank (UST) sites assumes that the following factors apply:

- 1) The tank or appurtenant structure that leaked has been repaired or permanently closed per requirements of Article 7, Section 2670 et seq. of Chapter 16 (CHAPTER 16), Title 23, CCR.
- 2) Free product has been removed to the extent practicable per requirements of Article 5, Section 2655 of CHAPTER 16.

## ***LOW RISK SOILS ONLY CASE***

### ***Criteria:***

- 1) **The leak has been stopped and ongoing sources of pollution are removed or remediated to the extent practicable.**

Sources of pollution may include soil which contains sufficient mobile constituents (e.g., leachable pollutants, vapors, or residual fuel product) to degrade surface or ground water resources in excess of water quality objectives as defined in the RWQCB Basin Plan. Residual fuel contaminated soils which are eroded and transported to storm drains, abandoned or active wells, surface waters, or lands beyond control of the discharger or which create exposures or hazardous conditions, and may pose a significant threat to human health or the environment should also be considered a source.

For older releases, the absence of current groundwater impact is often a good indication that residual concentrations present in the soil are not a potential source of future pollution. In general, if pollutants within fuel contaminated soil are not in contact, or expected to come in contact, with groundwater, it is unlikely that it is a significant source of pollution.

- 2) **The site has been adequately characterized.**

The extent of the subsurface impact should be defined to the degree that is necessary to determine if the site poses a threat to human health, the environment, or other nearby sensitive receptors. The level of detailed data required from a specific site will depend upon the anticipated depth to groundwater, the presence or absence of potential receptors, and exposure pathways. Delineation and characterization of environmental contamination needs to be completed to a sufficient level to accurately document conditions at the site. Delineating environmental contamination to non-detect levels may not be required at all sites.



**3) No groundwater impact currently exists.**

By definition, soils only cases do not have groundwater impacts. Results from contaminant leachability testing (e.g., U.S. EPA Method 1311 - modified TCLP or EPA Method 1312--SPLP) may be useful for responsible parties wishing to make a technical demonstration that residual soluble fuel contaminants do not pose a significant threat to groundwater resources.

**4) No groundwater, surface water, or other sensitive receptors are likely to be impacted.****5) The site presents no significant risk to human health.**

Site mitigation strategies which include elements of *"Risk Based Corrective Action"* (RBCA) may provide an acceptable methodology to perform a tiered risk analysis at petroleum release sites. RBCA methodologies usually incorporate elements of U.S. EPA risk assessment practices to determine non-site specific (e.g., generic risk based screening levels) and site specific clean up levels that are protective of human health and environmental resources. The responsible party may wish to propose a RBCA approach for consideration by the regulatory agencies.

Significant risks to human health may also include the creation of fire and explosion hazards from the migration and accumulation of fuel vapors in subsurface utilities (e.g., storm drains, sewer systems, utility vaults, etc) as well as excess lifetime cancer risk due to benzene vapor migration. Further corrective actions at some UST sites maybe necessary to mitigate these hazards as well.

**6) The site presents no significant risk to the environment.**

RBCA methodologies have no specific guidance for evaluating environmental risk although the basic framework is appropriate if site specific exposure pathways and ecological receptors are included. If the site has a potential to create fire and explosion hazards, significantly impact surface water, wetlands, or other sensitive receptors, it should not be considered "low risk."

***Management Strategy***

Low risk soils cases should be closed when it is determined that site conditions conform to the above criteria. Further remediation or monitoring is not required. If the most sensitive permitted use (e.g., residential) is not protected by the site cleanup levels which are protective of human health and water resources, then engineering (e.g., vapor barriers, caps, etc.) and/or administrative (land use restrictions or notifications) controls may be appropriate for the site. The site status should be re-evaluated when property transfers result in a change in land use (e.g., changes from commercial to residential uses). If fuel contaminated soils are subsequently disturbed, additional remedial or mitigative measures may be necessary and appropriate at the site.



***LOW RISK GROUNDWATER CASE******Criteria:***

- 1) **Groundwater has been impacted, the leak has been stopped and ongoing sources (as defined in LOW RISK SOIL ONLY CASE DEFINITION #1), including free product have been removed or remediated to the extent practicable.**
- 2) **The site has been adequately characterized (see Low Risk Soils Case Definition #2).**
- 3) **The site is located in a Basin without designated Municipal / Domestic Beneficial Use**

A site should not be considered "low risk" if current uses of water resources are known to exist but are not identified in the RWQCB Basin Plan.

- 4) **The site is located in a Basin with Municipal / Domestic Beneficial Use (Outside of a Sensitive Aquifer Boundary).**

Leaking UST sites located within the San Diego County Water Authority (CWA) service area footprint, not including sensitive aquifer areas, will be considered low risk ground water areas.

Designation of "low risk" groundwater sites also depend upon the status of the site with regard to the other criteria discussed in this section. The CWA service area extends approximately 18 miles inland from the coast and from the southern boundary of MCB Camp Pendleton to the U.S./Mexican border. The sensitive aquifer areas are the alluvial groundwater basins as defined by the Department of Water Resources (DWR) within the service area footprint of the CWA. Areas located outside the CWA service area footprint will generally not be considered low risk groundwater areas (see Q&A supplement for further discussion). Sites within a sensitive aquifer boundary and sites located in Riverside and southern Orange Counties will be evaluated on a case-by-case basis.

- 5) **The dissolved hydrocarbon plume is not migrating.**

Chemical concentrations of hydrocarbons in groundwater that decrease or do not change with time are the best indicators of a stable plume. Comparison of background and hydrocarbon plume concentrations of dissolved oxygen, iron, nitrate, sulfate, methane, and others, can provide evidence that in-situ biodegradation may be reasonably effective at a given site. These data may or may not be required to determine plume stability but can supplement other lines of evidence.

Stable or decreasing plumes often display short-term variability in groundwater concentrations. These effects are due to changes in groundwater flow, degradation rates, sampling procedures, and other factors which are inherently variable. This behavior should not necessarily be construed as evidence of an unstable plume but may be the natural variations of a stable plume in the environment.

**6) No water wells, deeper drinking water aquifers, surface water, or other sensitive receptors are likely to be impacted.**

No water wells (e.g., domestic supply, agricultural supply, construction related dewatering wells) located within 1,000 feet of a source or where the source is within the capture zone influenced by the well.

**7) The site presents no significant risk to human health.**

Until the State Water Resources Control Board (SWRCB) policies are modified to give RWQCB staff clear guidance on how to incorporate risk-based corrective action (RBCA) elements into the California corrective action process, RWQCB staff will require ground water clean up to restore beneficial uses and protect future beneficial uses of water resources. For low-risk groundwater cases, RWQCB staff will continue to allow natural attenuation to be considered on a site specific basis, along with other cost effective remedial technologies. In addition, various methods of evaluating contaminant transport may also be acceptable in determining residual levels of contaminants which are protective of human health and the environment.

Other factors to consider in evaluating this criteria include threats to human health (e.g., fire and explosion hazards, exposure to fugitive vapors, see Low Risk Soils Case Definition #5).

**8) The site presents no significant risk to the environment.**

The site specific evaluation must also include consideration of risks to sensitive environmental and ecological receptors as well. If the site has a potential to create fire and explosion hazards, or significantly impact beneficial uses of water resources, wetlands, or other sensitive environmental or ecological receptors, it should not be considered "low risk" (see Low Risk Soils Case, Definition No. 6).

***Management Strategy***

In general, sites located in "low risk" groundwater areas may cease active remediation (with agency approval) and natural attenuation (passive bioremediation, etc.) should be the preferred remedial alternative unless there is a compelling reason to do otherwise. A partial list of reasons that may justify active remediation are listed below:

- Groundwater within an impacted aquifer is likely to be used before natural attenuation is projected to complete the cleanup.
- Sensitive aquifers and/or sensitive receptors have been identified and are anticipated to be adversely impacted.
- The plume is migrating significantly.

Generally, if any of these conditions or others deemed to be compelling are met, a more aggressive remedial approach may be appropriate. The following criteria further refine the goals and objectives for managing "low risk" sites:

**1) Sites located in a Basin without designated Municipal / Domestic Beneficial Use.**

- a.) *Groundwater impacted sites which are located more than 1,000 feet from a marine surface water (e.g., bay, coastal lagoon, or ocean).* These sites can be closed when adequate information is presented to demonstrate that site conditions are protective of human health and the environment and that natural attenuation is effectively controlling and reducing the spread of dissolved fuel contaminants from the site.
- b.) *Groundwater impacted sites which are located less than 1,000 feet from a marine surface water (e.g., bay, coastal lagoon, or ocean).* Sites located in these areas may be closed when adequate information is presented to demonstrate that existing site conditions are protective of human health and the environment and the contaminant concentrations in groundwater have been reduced to those levels listed in Table 1.

**2) Sites located in a Basin with designated Municipal / Domestic Beneficial Use.**

- a.) Dischargers with sites located within the service area footprint of the CWA and which do not overlie sensitive aquifers (e.g., recharge areas, probable future ground-water use aquifers) may request the lead regulating agency to allow implementation of a natural attenuation remedial strategy. Long-term ground water monitoring will be required to verify the effectiveness of the natural attenuation site mitigation strategy at these sites. The specific wells to be included in the monitoring program and the frequency of sampling will be determined on a site by site basis.
- b.) Due to the reliance of inland communities on the use of groundwater resources for municipal/domestic water supplies, sites with fuel contaminated groundwater resources in areas outside the service area footprint of the CWA are **not** classified as "low risk" by the RWQCB. Sites which meet the criteria for "low risk" for inland communities will be evaluated on a case-by-case basis.
- c.) Sites in Orange County under the jurisdiction of the San Diego Regional Water Quality Control Board that do not overlie sensitive aquifers are generally considered to be low-risk groundwater cases. However, in addition to the location of contaminated sites with respect to sensitive aquifers, the sites will be rigorously evaluated with regard to the following: current and future water use plans of the water districts, potential for hydrocarbon plumes to contaminate sensitive aquifers (including sites that may contaminate surface waters that may recharge sensitive aquifers), ecological concerns, as well as health and safety concerns. Further evaluation of factors other than groundwater protection may indicate that the site does not qualify as being low risk.



**3) Monitor the site to determine plume stability and the site-specific effectiveness of the natural attenuation remedial strategy.**

Ground water monitoring is necessary to determine if site conditions will remain stable or improve over time. One hydrologic cycle (four quarters) of monitoring data is usually considered to be the minimum necessary to determine site conditions. This assumes depth to groundwater has significant seasonal variation and that no longer term variation occurs. If little seasonal fluctuation is expected, then one year of monitoring may not be required. Conversely, if depth to groundwater is expected to change significantly from year to year due to droughts, adjacent pumping, or other factors, then one year of monitoring may not be adequate.

Data from adjacent or nearby sites may be useful in determining groundwater fluctuations and other regional aquifer characteristics. Frequency of monitoring and the number of monitoring points may be adjusted after site characterization is completed. At many existing sites, these data may already have been collected.

This Interim Guidance document may be modified as additional recommendations become available from the State Board through the overall UST regulation review process (SB1764 Committee) and may be further refined to specifically address portions of Orange and Riverside Counties.

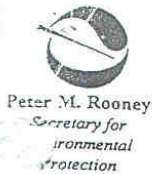
Coordinated &  
Prepared by:

Corey Walsh, Associate Engineering Geologist  
John Odermatt, R.G., Associate Engineering Geologist  
John Anderson, R.G., Senior Engineering Geologist  
Karen Zachary, WRC Engineer

**Table 1**

The table in the 1996 low-risk guidance was removed by RWQCB due to the specific numerical concentrations being obsolete and not fully protective of all beneficial uses.

**V. SAN DIEGO REGIONAL BOARD SUPPLEMENTAL INSTRUCTIONS AND INTERIM GUIDANCE ON REQUIRED CLEANUP AT LOW RISK FUEL CONTAMINATED SITES: APPENDIX A - GUIDANCE ON DATA COLLECTION REQUIREMENTS FOR THE EVALUATION OF RESIDUAL FREE PRODUCT OR LIGHT NON-AQUEOUS PHASE LIQUID (LNAPL) ON GROUNDWATER, JULY 22, 1998**



## California Regional Water Quality Control Board San Diego Region

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9771 Clairemont Mesa Boulevard, Suite A, San Diego, California 92124-1324  
Phone (619) 467-2952 • FAX (619) 571-6972



July 22, 1998

### Interested Parties

**SUBJECT: Regional Board Supplemental Instructions and Interim Guidance on Required Cleanup at Low-Risk Fuel Contaminated Sites: Appendix A - Guidance on Data Collection Requirements for the Evaluation of Residual Free Product or Light Non-Aqueous Phase Liquid (LNAPL) on Groundwater.**

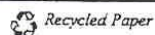
This appendix is intended for the regulatory and technical audience as an addendum to the San Diego Regional Water Quality Control Board ("RWQCB") Interim Guidance on Required Cleanup at Low-Risk Fuel Contaminated sites (dated April 1, 1996). The RWQCB Interim Guidance was developed to expand the interim guidance for leaking underground fuel tank (LUFT) sites provided in the December 8, 1995 letter from Mr. Walt Pettit, Executive Director of the State Water Resources Control Board. Mr. Pettit's letter urges cleanup agencies to proceed aggressively to close low risk soil only cases and not require active remediation of low risk groundwater cases.

State statutes and regulations specifically require corrective actions at leaking underground storage tank sites to be consistent with all applicable state policies for water quality control adopted pursuant to Article 3 (commencing with Section 13140) of Chapter 3 of Division 7 of the Water Code, and all applicable water quality control plans adopted pursuant to Section 13170 of the Water Code and Article 3 (Commencing with Section 13240) of Chapter 4 of Division 7 of the Water Code [CH&S, Chapter 6.75, Article 4, Section 25299.37(b) and 23 CCR, Chapter 16, Article 11, Section 2721].

The California Water Code (CWC) specifically requires that, state offices, departments, and boards shall comply with state policy for water quality control (CWC Section 13147) and water quality control plans (CWC Section 13247) unless otherwise directed or authorized by statute. These statutory requirements direct the State and Regional Boards to make regulatory decisions which are consistent with state policy regarding cleanup and abatement of wastes (SWRCB Resolution No. 92-49) and the local water quality control plans ("RWQCB Basin Plans"). Further, the state law requires that implementation of cleanup, abatement, or other action by the local agencies to be "... based upon cleanup standards specified by the board or regional board" [CH&S, Chapter 6.7, Section 25297.1(b)].

The California Code of Regulations, Title 23, Chapter 16, Articles 5 and 11 gives requirements for the investigation and removal of free product or light non-aqueous phase liquids (LNAPLs) from groundwater. Under Section 2655, the responsible party is required to "... remove free product to the maximum extent practicable, as determined by the local agency,...." In

*California Environmental Protection Agency*





Interested Parties: Appendix A  
RWQCB Interim Guidance

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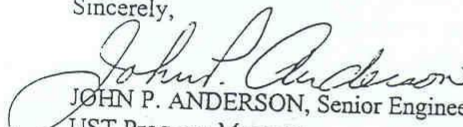
July 22, 1998

considering the definition of "maximum extent practicable" the RWQCB and local agencies must incorporate requirements from SWRCB Resolution No. 92-49 "*Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304*" (Section III.G) and references to 23 CCR, Chapter 15, Section 2550.4. The referenced section of Chapter 15 (also see CCR Title 27, Section 20400) provides a series of "factors" which must be evaluated before a groundwater cleanup level greater than background (or "CLGB") can be established by the Regional Board.

At some low-risk LUFT sites, it may be possible to make a determination that remediation of free product has proceeded to the maximum extent practicable in compliance with 23 CCR, Article 5, Section 2655. In the absence of specific technical guidance from the SWRCB on this issue, the guidance contained in Appendix A to the San Diego RWQCB Interim Guidance is designed to facilitate the collection of site-specific data needed to evaluate the factors which are necessary for this Regional Board to make a determination that free product removal has proceeded to the "maximum extent practicable." Wherever possible, these data should be provided within the impact assessment portion of a site-specific corrective action plan (or "CAP") as required by state regulations (23 CCR, Chapter 16, Article 11, Section 2725). While providing these data does not guarantee that a site will close with no further action required; it does give the Regional Board the data required to more objectively evaluate current and potential impacts to water quality associated with low-risk groundwater sites where residual free product remains in situ.

If you have any questions, or if my staff or I can be of any assistance, please call us at (619) 467-2952.

Sincerely,

  
JOHN P. ANDERSON, Senior Engineering Geologist  
UST Program Manager  
Site Mitigation and Cleanup Unit

JPA:jro      ustsd\lnapl.cov

cc:      Mr. Allan Patton, SWRCB Program Manager  
         Mr. Dave Deaner, SWRCB UST Cleanup Fund Manager  
         Regional Board UST Program Managers (via e-mail)  
         San Diego RWQCB Site Mitigation Staff  
         Mr. Dan Diehr, San Diego County Water Authority

*California Environmental Protection Agency*

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**Cal/EPA**

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**APPENDIX A**

**Guidance on Data Collection Requirements for the Evaluation of  
Residual Free Product or Light Non-Aqueous Phase Liquid (LNAPL)  
on Groundwater (July 1998)**

Pete Wilson  
Governor

This guidance is an appendix to the RWQCB *“Interim Guidance on Required Cleanup at Low-Risk Fuel Contaminated Sites”* dated April 1, 1996. There are a number of issues which should be adequately addressed before the San Diego Regional Water Quality Control Board (RWQCB) staff can properly evaluate a request to cease removal of *“free product”* or *“light non-aqueous phase liquids”* (or **LNAPL**) from the groundwater at petroleum contaminated sites. The specific answers to the questions listed below will help address the issues of technical and economic feasibility of site remediation, and allow the RWQCB staff to make an informed decision regarding actual risks to human health and environmental receptors posed by the environmental pollution remaining at sites. The following minimum information should be included in corrective actions plans (CAPs), where LNAPL is present at the site:

1. Identify the beneficial uses of groundwater and surface water for the hydrologic basin where the site is located (RWQCB, 1994). Complete the information on FORM 1 (attached) to answer the appropriate questions.
2. Evaluate the extent and impacts of the LNAPL pool on and off-property. Provide an estimate of the total volume of LNAPL present on groundwater and estimate the age of the release at the site. Provide a list of assumptions and the calculations in the text (also see discussion of methodologies by USEPA, 1996).

Provide a map clearly illustrating the estimated footprint of the LNAPL pool, on-site and adjacent land uses, locations of surface improvements, buildings, and subsurface utilities (and estimated depth of subsurface utilities) located on-site and adjacent to the site. The text should also provide an evaluation of general plan designations, land use zoning categories, and potential adverse impacts on projected land uses.

3. Evaluate the historical observations of free product. Provide a table of observed maximum thickness (in ft) of LNAPL over time. The narrative should include an evaluation of effects of water table fluctuations on the history of LNAPL occurrence in groundwater wells. A graph of variations in depth to water and LNAPL thickness with time, for each affected well, should be included in the report. Include the well number, date of observation, depth to top of well screen, depth to top of LNAPL, depth to water, and calculated/measured thickness of observed LNAPL.

4. Evaluate hydrogeological characteristics affecting advective contaminant transport and attenuation mechanisms, and plume stability at the site. For all basins, the minimum information shall include: estimates of the direction of groundwater flow and the proximity and withdrawal rates of groundwater users and dewatering projects. For sites located in basins with designated beneficial uses of groundwater (RWQCB, 1994), or within 1,000 feet of a sensitive receptor (*e.g., surface waters*) in basins where designated beneficial uses of groundwater do not exist, the evaluation shall include estimates of the range of site-specific soil pore-water velocity(ies) (in feet per year) for the aquifer at the site (see FORM 2 attached). The associated discussion shall include a comparison of the estimated site-specific rate(s) of contaminant transport and contaminant attenuation rates to evaluate potential impacts to the nearest sensitive receptor(s). Provide a list of assumptions, references, and calculations with the text.
5. Provide an evaluation of technical feasibility of removing all LNAPL from groundwater at the site. This analysis should include a reasonable estimated rate of LNAPL removal. This may be based upon observed site-specific LNAPL recovery rates and/or derived from historical operation of the LNAPL recovery system (if present) at the site. For example, the time frame for removal of free product may be estimated as:

$$\frac{\text{Volume of LNAPL (gallons)}}{\text{LNAPL Removal Rate (gal/day)}} = \text{No. of days to remove}$$

These data should be converted to appropriate units of time (*e.g., years, days, etc*) for convenience. Also see discussion of this topic provided by USEPA (1996). Provide a list of assumptions and the associated calculations with the text.

6. Provide an estimate of the economic feasibility of removing all LNAPL from groundwater at the site. The estimate should include data from past operations of free product removal systems at the site, if available. Future capital improvements and O&M costs should be estimated for completion of free product removal at the site. Provide a list of assumptions and a table of itemized estimated costs with the text.

7. Tabulate the characteristics of the waste(s) left in-situ, including the type of LNAPL (e.g., gasoline, diesel fuel, etc), and the chronology of past efforts to remove LNAPL from groundwater at the site. The information provided should include the following:

- a) Solubility of the fresh product *versus* on-site LNAPL.
- b) Estimated/measured content of fuel constituents in the fresh product and residual concentrations observed in LNAPL currently at the site.
- c) Vapor pressure of the fresh product *versus* on-site LNAPL.
- d) A chronology of attempts to remove LNAPL from the site, including a short description of limitations encountered and an estimated total volume recovered to date.

Some of these data may be derived from a combination of site-specific measurements and data cited from available technical references, as appropriate.

8. Provide an evaluation of the environmental persistency of water quality impairment at the site. Provide an estimate for the length of time (in years) the residual LNAPL (concentrations of product above solubility limit) will remain at the site. This may be done by modeling explicit attenuation processes and/or using site-specific chemical parameters (e.g., ratios of constituents, etc.) indicative of LNAPL attenuation. Provide a list of rationale, assumptions, and associated calculations with the text.
9. Provide an evaluation of risks to human health from exposure to product and/or vapors from the residual LNAPL. Provide results and map from a vapor survey(s) of soils and/or utilities located at/adjacent to the site. Provide a list of assumptions and any associated calculations with the text (e.g., USEPA, 1989). The discussion in the text should also include an evaluation of potential impacts to water resources in basins where groundwater development projects are planned (for examples see SDCWA, 1997), persistence and permanence of potential adverse effects on surface water/groundwater quality, and beneficial uses of water resources.
10. Provide an evaluation of risk from fire and explosion hazards associated with residual LNAPL and/or associated vapors from the site. Provide specific narrative rationale, tabulated on-site measurements, and a site plot plan with vapor survey results (for utilities) to support the stated conclusions in the text.



11. *Provide an evaluation of risks to environmental (including ecological) receptors from exposure to product and/or vapors from residual LNAPL.*  
Discuss the proximity of the wastes at the site to surface waters and potential/actual hydraulic connections between groundwater and surface water resources. Provide a list of assumptions and any associated risk calculations with the text.

The responsible party(ies) should provide the requested information in a corrective action plan (CAP) or a *"short and concise"* letter with the limited number of attachments (or appendices) containing the information requested above. The attached references section includes a short list of references of current State requirements for water quality protection and technical references which may help with preparation of the information requested above.

sdwqcb:s:\site\guidance\lnapl.doc

#### REFERENCES

- County Water Authority (SDCWA), 1997, San Diego County Water Authority Groundwater Report, dated June 1997.
- RWQCB, 1994, Water Quality Control Plan for the San Diego Basin (9), dated September 8, 1994.
- RWQCB, 1996, Regional Board Supplemental Instructions to State Water Board December 8, 1995, Interim Guidance on Required Cleanup at Low-Risk Fuel Contaminated Sites, dated April 1, 1996.
- State Water Resources Control Board, 1996, Resolution No. 92-49: Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304, dated October 2, 1996.
- US Environmental Protection Agency (USEPA), 1996, How to Effectively Recover Free Product at Leaking Underground Storage Tank Sites: A Guide for State Regulators. EPA 510-R-96-001, dated September 1996.
- US Environmental Protection Agency (USEPA), 1993, Guidance for Evaluating Technical Impracticability of Ground-Water Restoration. Directive 9234.2-25, dated September 1993.
- US Environmental Protection Agency (USEPA), 1989, Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part A). EPA/540/1-89/002, dated December 1989.

**BENEFICIAL USES OF WATER RESOURCES**  
Data Entry Form

Site **NAME**: \_\_\_\_\_

Site **ADDRESS**: \_\_\_\_\_

**CITY/COUNTY/ZIP**: \_\_\_\_\_

Nearest Major Cross-Streets: \_\_\_\_\_

Hydrologic Unit **NAME** and **BASIN NUMBER**: \_\_\_\_\_  
(e.g. San Diego Mesa, HU 8.20)

Nearest Surface Water (**NAME**): \_\_\_\_\_

Approximate distance to Surface Water (in feet): \_\_\_\_\_

Ground Water Exempted from MUN (RWQCB, 1994 <sup>1</sup>): ☐ YES ☐ NO

Sensitive Aquifer (RWQCB, 1996<sup>2</sup>): ☐ YES ☐ NO

Designated Existing or Potential Beneficial Uses of Surface Water (check all that apply <sup>1</sup>)

☐ MUN ☐ AGR ☐ IND ☐ PROC ☐ GWR ☐ FRSH ☐ POW ☐ SPWN  
☐ REC1 ☐ REC2 ☐ BIOL ☐ WARM ☐ COLD ☐ WILD ☐ RARE  
☐ NAV ☐ EST ☐ MAR ☐ COMM ☐ AQUA ☐ MIGR ☐ SHELL

Designated Existing or Potential Beneficial Uses of Ground Water (check all that apply <sup>1</sup>)

☐ MUN ☐ AGR ☐ IND ☐ PROC ☐ FRSH ☐ GWR

San Diego RWQCB LNAPL FORM 1: May 1998

<sup>1</sup> RWQCB, 1994, Water Quality Control Plan for the San Diego Basin (9), dated September 8, 1994.

<sup>2</sup> RWQCB, 1996, Regional Board Supplemental Instructions to State Water Board December 8, 1995, Interim Guidance on Required Cleanup at Low-Risk Fuel Contaminated Sites, dated April 1, 1996.

### **Groundwater Velocity Calculations**

**Estimate velocity of groundwater from Darcy Equation:**

$$V_w = K_h (I) / \theta$$

$V_w$  = velocity of groundwater

$K_h$  = hydraulic conductivity

$I$  = groundwater gradient

$\theta$  = saturated porosity

**Saturated porosity (%):**

(list the source of this information: laboratory measurement, reference text, other - provide explanation)

**Hydraulic conductivity (also specify units):**

(list the source of this information: laboratory measurement, aquifer pump test, aquifer slug test, reference text, other - provide explanation)

**Groundwater gradient (unitless):**

(list the source of this information: site-specific measurement, reference text, other - provide explanation)

**Groundwater velocity -  $V_{YR}$  (ft/year):**

**Distance to nearest sensitive receptor (e.g., water well(s), surface water, habitat area)(in ft):**

**Estimated time of travel to nearest receptor (Distance /  $V_{YR}$ ) in years:**

**Provide an evaluation of mitigating attenuation factors, if any at this site. Include a list of assumptions and associated calculations as necessary to support the analysis. Attached other sheets as necessary.**

San Diego RWQCB LNAPL FORM 2: May 1998

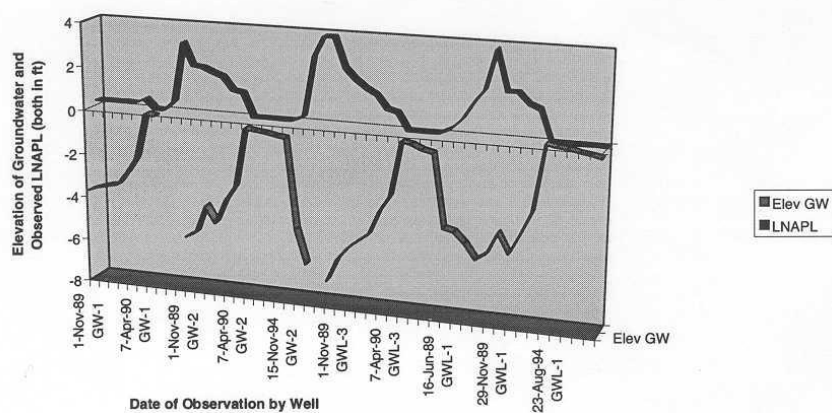


Figure 1

San Diego RWQCB LNAPL GUIDANCE Figure 1: May 1998



*Our mission is to preserve and enhance the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations.*

## **VI. SAN DIEGO REGIONAL BOARD NON-PURGE GUIDANCE**





**LEPA**

San Diego  
Regional Water  
Quality Control  
Board

9771 Clairemont Mesa  
Blvd., Suite A  
San Diego, CA 92124  
(619) 467-2952  
FAX (619) 571-6972  
BBS (619) 467-2958

June 20, 1997

To: Interested Parties

**SUBJECT: USE OF NONPURGE METHOD FOR SAMPLING OF GROUND  
WATER MONITORING WELLS AT GASOLINE IMPACTED  
SITES.**

It has been suggested that there may not be a need to purge ground water wells prior to sampling. Under certain circumstances, reliable and representative ground water data from gasoline contaminated underground storage tank (UST) sites can be obtained without purging. Well purging can increase costs due to labor, time, equipment needs, and purge water disposal. Significant cost savings could be realized if representative ground water samples could be collected without prior purging of the well(s).

In October 1996, a report entitled "The California Groundwater Purging Study for Petroleum Hydrocarbons," was prepared for the Western States Petroleum Association (WSPA) by SECOR International Incorporated. This report presented the results of an evaluation of the necessity for purging wells prior to ground water sampling. The report provided an extensive literature review of well purging principles and a historical perspective of well purging. Ground water samples were collected from contaminated sites from various regions in California. Based on the comparison of 4,808 selected nonpurge/post-purge data pairs from 556 wells, the authors concluded that there was no statistically significant difference between the nonpurge and post-purge concentration results for gasoline constituents. Copies of this report can be obtained through WSPA in Sacramento at (916) 498-7753.

The State Water Resources Control Board UST Program Manager, Mr. Allan Patton, issued a guidance letter to the Local Oversight Program (LOP) agencies and Local Implementing Agencies (LIAs) on March 26, 1997, regarding "California Groundwater Purging Study for Petroleum Hydrocarbons." The letter acknowledged the results of the WSPA report, stated that there were limitations to the nonpurge sampling method, and concluded that a nonpurge sampling method, where applicable and appropriate, should be implemented in order to reduce costs whenever possible.



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Pete Wilson  
Governor

Nonpurge Sampling Criteria

-2-

June 20, 1997

San Diego Regional Water Quality Control Board (RWQCB) staff has reviewed the WSPA report and concludes that a nonpurge sampling method is applicable if the following minimum conditions described below are met:

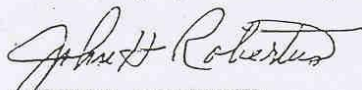
1. The only contaminants of concern are gasoline petroleum hydrocarbons (e.g. TPHg, benzene, toluene, ethylbenzene, total xylenes, and MTBE); and
2. No free phase petroleum hydrocarbon exists in the well; and
3. All pertinent well construction details are known to the lead regulatory agency; and
4. The well has been appropriately developed; and
5. The ground water monitoring well is screened across the water table in an unconfined aquifer (no submerged well screen).

Prior to implementation of the nonpurge sampling method, the responsible party must notify the lead regulatory agency, in writing, of the intent to implement this sampling protocol and receive concurrence from the lead regulatory agency. This notification must include a signature of a California registered professional (RG, PE, CEG, RH) certifying that the above conditions have been met.

A site-specific nonpurge/post-purge ground water monitoring study may be used to evaluate wells not meeting the above minimum criteria. On a case by case basis, should the results of a site-specific nonpurge/post-purge study show that no statistically significant variance in the petroleum hydrocarbon concentrations exist, and the report has been submitted and approved by the lead regulatory agency, then a nonpurge sampling method may be applicable and appropriate for the site.

When a responsible party requests site closure, the lead regulatory agency may require that a final round of purged ground water samples be collected from the monitoring well(s).

If you have any questions, please contact the Regional Board staff assigned to your UST case (619) 467-2952 or the staff of the appropriate local oversight agency.



JOHN H. ROBERTUS  
Executive Officer

cc: Regional Board Members  
Allan Patton, SWRCB UST Program Manager  
Regional Board UST Program Managers  
San Diego County LOP  
Orange County LOP  
Riverside County LOP



*Our mission is to preserve and enhance the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations.*

**VII. SAN DIEGO REGIONAL BOARD ORDER R9-2002-342: WASTE DISCHARGE  
REQUIREMENTS FOR THE DISPOSAL AND/OR REUSE OF PETROLEUM FUEL  
CONTAMINATED SOILS (FCS) IN THE SAN DIEGO REGION**





Winston H. Hickox  
Secretary for  
Environmental  
Protection

## California Regional Water Quality Control Board San Diego Region

Internet Address: <http://www.swrcb.ca.gov/rwqcb9/>  
9174 Sky Park Court, Suite 100, San Diego, California 92123-4340  
Phone (858) 467-2952 • FAX (858) 571-6972



Gray Davis  
Governor

December 13, 2002

To: Interested/Affected Parties

Dear Representatives:

**RE: ORDER R9-2002-342: "WASTE DISCHARGE REQUIREMENTS FOR THE DISPOSAL AND/OR REUSE OF PETROLEUM FUEL CONTAMINATED SOILS (FCS) IN THE SAN DIEGO REGION."**

On December 11, 2002, the Regional Board adopted Order R9-2002-342 and Monitoring and Reporting Plan No. R9-2002-342. This Order contains waste discharge requirements (WDRs) that will replace the conditional waiver Resolution No. 95-63: "*A Resolution Conditionally Waiving Adoption of Waste Discharge Requirements for Disposal/Reuse of Petroleum Hydrocarbon Fuel Contaminated Soils (FCS)*." Resolution No. 95-63 (and addenda thereto) will expire on January 1, 2003.

The following are some of the requirements included in the attached Order R9-2002-342:

1. Order R9-2002-342 requires that dischargers file the following application materials with the RWQCB: a.) an application (Form 200) for Waste Discharge Requirements (WDRs), b.) a filing fee, and c.) a completed Fuel Contaminated Soil (FCS) Certification form (and supporting information). The RWQCB staff will review the application materials to determine if the proposed discharge is eligible to enroll for coverage by the Order R9-2002-342. As of the date this Order was adopted, the filing fee was set at \$1,500 as established by the State Water Resources Control Board pursuant to California Code of Regulations Title 23, Section 2200. The fee payment should be submitted to the RWQCB, but made payable to the "State Water Resources Control Board."
2. Order R9-2002-342 covers discharges of soil wastes containing only petroleum hydrocarbon fuel constituents, including gasoline, aviation gasoline, diesel fuel, jet fuels (Jet A, JP-4, and JP-5), kerosene, and fuel oils.
3. Order R9-2002-342 prohibits discharges of FCS wastes that contain "waste oil" or "waste oil constituents" or hazardous wastes as defined by California Code of Regulations (CCR), Title 22, Division 4.5.
4. Order R9-2002-342 establishes that waste characterization criteria that discharges FCS wastes must meet in order to be consistent with the definition of "inert wastes" included in CCR, Title 27, §20230.
5. Order R9-2002-342 sets specific minimum site and waste reuse criteria to identify sites that are eligible to receive discharges of FCS wastes for purposes of reuse/disposal as engineered fill.

**California Environmental Protection Agency**

Recycled Paper



Interested/Affected Parties  
 Order R9-2002-342: General WDRs  
 for Reuse/Disposal of Fuel Contaminated  
 Soils (FCS) in the San Diego Region

- 2 -

December 13, 2002

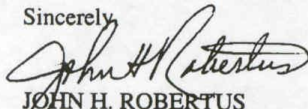
6. Order R9-2002-342 sets site-specific criteria and establishes waste discharge requirements for management of temporary waste piles of FCS wastes.
7. Order R9-2002-342 requires that dischargers report to the RWQCB all waste characterization results for each separate source of FCS wastes discharged at the site.
8. Order R9-2002-342 requires that dischargers conduct public notification and periodic inspections to ensure the discharge(s) of FCS wastes do not create a condition of pollution or nuisance.
9. Order R9-2002-342 requires the dischargers to provide the RWQCB with a technical report that details the final reuse/disposal conditions at the site.
10. Order R9-2002-342 requires the dischargers to properly manage any temporary waste piles created under this Order. The dischargers are required to develop and implement site-specific Best Management Practices (BMPs) for control of erosion and conveyance of storm water.
11. Order R9-2002-342 requires that new construction and maintenance activities comply with the applicable requirements of State Board General Order 99-08-DWQ "Waste Discharge Requirements for Discharges of Storm Water Associated with Construction Activity."

You are being sent a copy of this Order because the RWQCB has identified you or your organization as an Interested or Affected Party for Order No. R9-2002-342. Electronic copies of Order R9-2002-342 and Monitoring and Reporting Program R9-2002-342 are also available from our web site at:

<http://www.swrcb.ca.gov/rwqcb9/orders/orders.html>

Should you have any questions concerning Order R9-2002-342, please contact Mr. Brian McDaniel at (858) 627-3927 or by email at [mcdab@rb9.swrcb.ca.gov](mailto:mcdab@rb9.swrcb.ca.gov) or Mr. John Odermatt at (858) 637-5595 or by email at [oderj@rb9.swrcb.ca.gov](mailto:oderj@rb9.swrcb.ca.gov).

Sincerely,

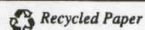


JOHN H. ROBERTUS  
 Executive Officer

Enclosures: Order R9-2002-342  
 Fuel Contaminated Soil (FCS) Certification Form – Order R9-2002-342  
 Monitoring and Reporting Plan R9-2002-342

Cc: Interested Parties List (see attached) with Enclosure

**California Environmental Protection Agency**





**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN DIEGO REGION**

 9174 Sky Park Court, Suite 100  
San Diego, CA 92123-4340

Attention: Land Discharge Unit

**FCS Disposal Certification Form  
In Accordance With Order No. R9-2002-342**
**I. Generator of Contaminated Soil**

Generator Name:					
Mailing Address:					
City:	County:	State:	Zip:	Phone:	FAX:
Contact:			Title:		

**II. Present Status of Contaminated Soil**

Site Location:					
Property Owner Name:					
City:	County:	State:	Zip:	APN No.:	
DEH/RWQCB Case No.:	Date Gen.:	Quantity (Cu. Yds.):	Method of Containment:		

Soil Contaminants		Contaminant Concentrations							
Contaminant Type: <input type="checkbox"/> Unleaded Gasoline <input type="checkbox"/> Leaded Gasoline <input type="checkbox"/> Diesel <input type="checkbox"/> Kerosene <input type="checkbox"/> Jet Fuel Additives: <input type="checkbox"/> MTBE <input type="checkbox"/> None <input type="checkbox"/> Other		<b>TPH-Gas</b>		<b>TPH- Diesel</b>		<b>Leachable Diesel</b>		<b>Other:</b>	
		Mean	Mean + 80% C.I.	Mean	Mean + 80% C.I.	Mean	Mean + 80% C.I.	Mean	Mean + 80% C.I.
		<b>Benzene</b>		<b>Toluene</b>		<b>Ethylbenzene</b>		<b>Xylenes</b>	
		Mean	Mean + 80% C.I.	Mean	Mean + 80% C.I.	Mean	Mean + 80% C.I.	Mean	Mean + 80% C.I.
		<b>Leach. Benzene</b>		<b>Leach. Toluene</b>		<b>Leach. Ethylbenzene</b>		<b>Leach. Xylenes</b>	
		Mean	Mean + 80% C.I.	Mean	Mean + 80% C.I.	Mean	Mean + 80% C.I.	Mean	Mean + 80% C.I.

**III. Disposal Site Information**

<b>Site Conditions Met</b> <input type="checkbox"/> Ground Water Separation <input type="checkbox"/> Surface Water Separation <input type="checkbox"/> Flood Plain Protection <input type="checkbox"/> Cover of Stockpiled Soil <input type="checkbox"/> Ground Water Dependent Area <input type="checkbox"/> Land Use Restriction	<b>Site/Property Information</b> Property Owner: Property Address: City: County: State: Zip: Contact: Phone:
--	--

**Property Owner Acknowledgement**

I hereby acknowledge receipt of the waste described in this notice, and acknowledge that I have reviewed any associated reports. By signing this form I acknowledge that the Generator of this waste has certified that all the conditions of Order No. R9-2002-342 have been met.

Print Name: \_\_\_\_\_ Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**IV. Generator Certification**

I hereby certify that the information provided regarding soil characterization is a complete and accurate representation of the subject soil, and that the soil is not hazardous waste as defined by the California Code of Regulations, Title 22, and by the United States Environmental Protection Agency, and that all conditions of Order No. R9-2002-342 have been met.

Print Name: \_\_\_\_\_ Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**For Agency Use Only RWQCB Regulatory Program:**

☐ LDU ☐ DoD/SLIC ☐ UST/AGT/LOP County \_\_\_\_\_

California Regional Water Quality Control Board, San Diego Region

Version: 9/20/02a

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN DIEGO REGION

ORDER NO. R9-2002-0342

WASTE DISCHARGE REQUIREMENTS  
FOR THE DISPOSAL AND/OR REUSE OF  
PETROLEUM FUEL CONTAMINATED SOILS (FCS)  
IN THE SAN DIEGO REGION

The California Regional Water Quality Control Board, San Diego Region (hereinafter the RWQCB) finds that:

1. California Water Code Section 13260(a) requires that any person discharging waste or proposing to discharge waste within any Region, other than to a community sewer system, that could affect the quality of the waters of the State, file a Report of Waste Discharge (RWD).
2. Under authority of Water Code Section 13263(d), the RWQCB may prescribe waste discharge requirements although no report of waste discharge has been filed.
3. California Water Code Section 13263(a) requires that California Regional Water Quality Control Board prescribe requirements for existing and proposed discharges in their respective areas of jurisdiction.
4. California Code of Regulations, Title 27 (27 CCR), Article 1, commencing with Section 20080 contains requirements governing discharges of nonhazardous solid wastes to land.
5. The issuance of this Order establishing general waste discharge requirements is consistent with the State Water Resources Control Board Strategic Plan and its goal to provide water resources protection, enhancement and restoration while balancing economic and environmental impacts.
6. Pursuant to Water Code Section 13263(i), the RWQCB finds that:
  - a. For the purposes of this Order, petroleum fuel contaminated soils ("*FCS wastes*") are defined as soils containing elevated concentrations, above natural background concentrations, of constituents from the following fuel sources: gasoline, aviation gasoline ("av-gas"), diesel fuel, jet fuels (Jet A, JP-4 and JP-5), kerosene, and fuel oils. FCS wastes are commonly created as a result of unauthorized releases (leaks) of petroleum fuel constituents from a number of similar fuel containment systems, including leaking underground storage tank systems, leaking fuel pipelines, and leaking above ground storage tank systems. FCS wastes are categorically classified as "designated wastes" pursuant to Water Code Section 13173.



Order No. R9-2002-0342:  
General WDRs for Disposal and/or Reuse  
of Fuel Contaminated Soils.

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December 11, 2002

- b. Unauthorized releases of gasoline and diesel fuel constituents into soils from fuel containment systems identified in Finding 6.a. result in the same or similar types of wastes (i.e., fuel contaminated soils).
- c. FCS wastes used as engineered fill must be consistent with the criteria for "inert wastes" as identified in California Code of Regulations, Title 27, § 20230. Therefore, FCS wastes require the same or similar treatment standards for disposal and/or reuse as engineered fill.
- d. The dischargers are more appropriately regulated under general discharge requirements than individual discharger requirements because:
  - i. The regulated reuse of FCS wastes in redevelopment projects is an effective alternative to disposing of those wastes in existing municipal solid waste landfills.
  - ii. Projects involving disposal and/or reuse of FCS wastes commonly require the implementation of the same or similar waste characterization protocols, waste management/containment criteria, and site-specific criteria for the protection of water quality.
  - iii. These General WDRs would reduce RWQCB time expended on preparing and considering individual waste discharge requirements for each project.
  - iv. These General WDRs would significantly simplify and expedite the application process for the dischargers.
  - v. These General WDRs would allow the RWQCB to more effectively and efficiently regulate discharges of FCS wastes for disposal and/or reuse in the San Diego Region.
- 7. The RWQCB finds that the uncontrolled discharge of FCS wastes may adversely affect the waters of the state.
- 8. On May 16, 1995 this RWQCB adopted Resolution No. 95-63: "A Resolution Conditionally Waiving Adoption of Waste Discharge Requirements for Disposal/Reuse of Petroleum Hydrocarbon Fuel Contaminated Soils (FCS)."
- 9. On February 13, 1997, the RWQCB adopted Addendum No. 1 to Resolution No. 95-63. Addendum No. 1 placed additional use restrictions upon the reuse/disposal of FCS wastes.



Order No. R9-2002-0342:  
General WDRs for Disposal and/or Reuse  
of Fuel Contaminated Soils.

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December 11, 2002

10. On October 10, 1999, Senate Bill 390 was signed into law amending Water Code Section 13269 and 13350. As a result of those amendments, all of the RWQCB's existing conditional waivers will expire on January 1, 2003.
11. The RWQCB has notified interested parties of its intent to adopt Order No. R9-2002-0342, superseding Resolution No. 95-63 and addenda thereto.
12. Because there is a potential impact to water quality from the uncontrolled discharge (reuse/disposal) of FCS wastes to land, the RWQCB finds that the discharges of FCS wastes are of category III-C as defined Title 23, Section 2200. Category "III" – include those discharges of waste that could degrade water quality without violating water quality objectives, or could cause a minor impairment of designated beneficial uses. A complexity rating of "C" is assigned to any discharge for which waste discharge requirements have been prescribed pursuant to Section 13263 of the Water Code not included as a Category "A" or Category "B". Included would be discharges having no waste treatment systems or that must comply with best management practices.

#### CEQA COMPLIANCE

13. On November 15, 1993, the RWQCB adopted a Negative Declaration (Resolution No. 93-103) for three types of discharges, including the disposal and reuse of petroleum hydrocarbon fuel contaminated soils. This action complies with the requirements of the California Environmental Quality Act (Public Resources Code, Section 21000, et seq.) and State guidelines. In adopting the Negative Declaration, the RWQCB determined that discharges wastes meeting the specified conditions would not result in any significant adverse water quality impacts.

#### OTHER LEGAL REFERENCES

14. The **Water Quality Control Plan Report, San Diego Basin (9)** (hereinafter Basin Plan), was adopted by this RWQCB on September 8, 1994, and subsequently approved by the State Water Resources Control Board (State Board) on December 13, 1994. The Basin Plan designates beneficial uses and narrative and numerical water quality objectives, and discharge prohibitions applicable to the discharges regulated under this Order.
15. The Basin Plan designates the following beneficial uses for ground waters resources within the San Diego Region:
 

a.	Municipal and domestic water supply	(MUN)
b.	Agricultural water supply	(AGR)
c.	Industrial service supply	(IND)
d.	Industrial process supply	(PROC)

Order No. R9-2002-0342:

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December 11, 2002

General WDRs for Disposal and/or Reuse  
of Fuel Contaminated Soils.

16. The Basin Plan designates some or all of the following beneficial uses of surface water resources located within the San Diego Region:
- |    |  |         |
|----|--|---------|
| a. | Municipal and domestic supply                            | (MUN)   |
| b. | Agricultural supply                                      | (AGR)   |
| c. | Industrial service supply                                | (IND)   |
| d. | Industrial process                                       | (PROC)  |
| e. | Groundwater recharge                                     | (GWR)   |
| f. | Freshwater replenishment                                 | (FRSH)  |
| g. | Navigation   | (NAV)   |
| h. | Hydropower generation                                    | (POW)   |
| i. | Water contact recreation                                 | (REC1)  |
| j. | Noncontact water recreation                              | (REC2)  |
| k. | Commercial and sport fishing                             | (COMM)  |
| l. | Warm freshwater habitat                                  | (WARM)  |
| m. | Cold freshwater habitat                                  | (COLD)  |
| n. | Preservation of areas of special biological significance | (BIOL)  |
| o. | Inland saline water habitat                              | (SAL)   |
| p. | Wildlife habitat   | (WILD)  |
| q. | Preservation of rare and endangered species              | (RARE)  |
| r. | Marine habitat   | (MAR)   |
| s. | Migration of aquatic organisms                           | (MIGR)  |
| t. | Spawning, reproduction, and/or early development         | (SPWN)  |
| u. | Shellfish harvesting                                     | (SHELL) |
| v. | Estuarine habitat  | (EST)   |
| w. | Aquacultural   | (AQUA)  |
17. Discharges (i.e., for reuse/disposal) of FCS wastes may occur in areas that overlie ground water basins designated as suitable for uses including municipal and domestic public water supplies. Applicable numeric and narrative water quality objectives for groundwater resources are promulgated in Chapter 3 of the Water Quality Control Plan for the San Diego Region.
18. Discharges (i.e., for reuse/disposal) of FCS wastes may occur in areas located in proximity to surface waters that support beneficial uses including recreation (REC1 and REC2) and support of fish and wildlife (COLD, WARM, WILD, RARE). Applicable numeric and narrative water quality objectives for surface water resources are promulgated in Chapter 3 of the Water Quality Control Plan for the San Diego Region.
19. Additional State water quality criteria for beneficial uses of water resources as a public drinking water supply are promulgated in California Code of Regulations (CCR), Title 22, Division 4, Chapter 15, Article 4, §64431 (Primary MCLs for inorganic chemicals), §64443 (MCLs for man-made radioactivity), §64444 (Primary MCLs for organic



Order No. R9-2002-0342:  
General WDRs for Disposal and/or Reuse  
of Fuel Contaminated Soils.

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December 11, 2002

chemicals), §64449 (Secondary MCLs), and Chapter 17.5, Article 1, §64672.3 (copper and lead action levels).

20. Additional State and Federal water quality criteria for protection of beneficial uses of surface water resources are promulgated by the U.S. Environmental Protection Agency as the California Toxics Rule (CTR) as implemented by State Water Resources Control Board Resolution Nos. 2000-015 and 2000-030.
21. The San Diego Region contains a number of impaired water bodies identified on the statewide 303-d list published in 1998. Environmental pollutants/stressors associated with the impairment of water bodies in the San Diego Region include: sediments, metals (e.g., cadmium, copper, lead, nickel, thallium, and zinc) and sediment toxicity. Discharges of FCS wastes could occur within hydrologic subareas that contain impaired water bodies, as identified on the 303-d list, in the San Diego Region.
22. This Order does not preempt or supersede the authority of other State and local agencies to prohibit, restrict, or control discharges of waste subject to their jurisdiction.
23. The RWQCB finds that a variety of approaches may be effective as Best Management Practices (BMPs) for control of surface water runoff and erosion of soils/sediments and FCS wastes. Deployment of bonded fiber matrix materials, anchored fiber rolls, and fiber blankets, among other measures, can be effective BMPs for erosion control and conveyance of surface water runoff if designed and applied as appropriate for site-specific conditions.
24. For applicable projects, it is appropriate for the discharger to file the required notice of intent (NOI) and application fee for coverage under State Board Order No. 99-08-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, "Waste Discharge Requirements for Discharges of Storm Water Associated Construction Activity."
25. Under the conditions of this Order, dischargers may find it necessary to establish and maintain temporary waste piles of FCS wastes. Therefore, it is appropriate for this Order to include waste discharge requirements for regulating the discharges of FCS wastes into temporary waste piles.
26. The RWQCB has considered all water quality related environmental factors associated with the category of waste discharges (reuse/disposal) covered by this order.
27. The RWQCB has notified potential dischargers and all other known interested parties of the intent to prescribe WDRs as described in this order.

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28. The RWQCB, in a public meeting, heard and considered all comments pertaining to the proposed discharge.

**IT IS HEREBY ORDERED**, that each person enrolled in this Order (hereinafter the "discharger"), meet the provisions contained in Division 7 of the California Water Code and regulations adopted therein and shall comply with the following:

**A. ENROLLMENT PROCEDURE**

1. In order to enroll for coverage under this Order, the discharger shall submit the FCS certification from (attached to this Order) and appropriate filing fee for each location/property proposed to receive a discharge of FCS wastes. The Report of Waste Discharge (RWD) shall include the following:
  - a. Application/Report of Waste Discharge general information form (Form 200) filled out in accordance with the instructions.
  - b. Completed FCS certification form filled out in accordance with the instructions.
  - c. Copies of all analytical results, associated laboratory data sheets, including QA/QC data and chain of custody documents.
  - d. A discussion of the discharge site and petroleum hydrocarbon FCS (waste) characteristics including:
    - i. Identification of the period during which waste is to be disposed of at the site;
    - ii. Description of disposal methods, operation and maintenance activities;
    - iii. Description of types and quantities of waste to be disposed of;
    - iv. Present and future land use.
  - e. The discharger shall file a notice of intent (NOI) and application fee, as applicable, for coverage under State Board Order No. 99-08-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, "Waste Discharge Requirements for Discharges of Storm Water Associated Construction Activity."
  - f. Documentation of how the discharger will comply with all applicable requirements of this Order and Monitoring and Reporting Program R9-2002-0342.



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- g. A topographic map at an appropriate scale and other information clearly illustrating the location, owners, and uses of all wells located within one mile of the site.
  - h. Any other information pertinent to the protection of water quality or public health and prevention of nuisance.
2. Discharges of FCS waste (for reuse/disposal) may be enrolled through the procedure identified in **Section A** of this Order or by the RWQCB under the authority cited in **Finding 2**. In either case, the discharger may receive written notification from the RWQCB stating whether it is appropriate to regulate the inactive landfill under these general waste discharge requirements (WDRs), or that individual WDRs are required.
  3. It may be necessary for a discharger authorized under this Order to apply for and obtain an individual waste discharge requirements (WDRs) with more discharge- specific requirements. When individual WDRs are issued to a discharger, the applicability of this general permit to the individual enrollee shall be terminated on the effective date of the individual WDRs.
  4. Notwithstanding the conditions specified above, individual cases may be brought to the RWQCB for consideration of waste discharge requirements when deemed appropriate.

**B. DISCHARGE PROHIBITIONS**

1. Discharges of wastes to land for treatment, storage, or disposal are prohibited; unless the RWQCB has issued valid Waste Discharge Requirements for that discharge.
2. The acceptance or discharge of "hazardous waste" is prohibited. For the purposes of this Order, the term "hazardous waste" is as defined in California Code of Regulations (CCR) Title 22, Division 4.5, § 66261 *et seq.*
3. The acceptance or discharge of soils containing "waste oil", under the definition of California Health and Safety Code Section 25250.4, is prohibited.
4. The acceptance or discharge of FCS wastes containing waste constituents, other than those listed in Table 1, above natural background concentrations is prohibited.
5. The disposal/reuse of FCS wastes to land is prohibited unless the required application (Form 200), application fee, and FCS certification report for the discharge has been submitted to the RWQCB.
6. The discharge of solid waste containing free liquid or moisture, in excess of the waste's moisture holding capacity, is prohibited.

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7. The dumping, deposition, or discharge of waste directly into waters of the state, or adjacent to such waters in any manner, under which wastes may be transported into the waters, is prohibited unless authorized by the RWQCB.
8. The discharge of waste or waste constituents to ground water or surface waters at, beneath, or adjacent to the facility is prohibited.
9. The discharge of wastes in a manner that creates nuisance conditions (from odors, vectors, and other nuisances) is prohibited.
10. The discharge of waste to waters of the state in a manner causing, or threatening to cause a condition of pollution, contamination or nuisance as defined in California Water Code Section 13050, is prohibited.
11. Basin Plan discharge prohibitions shall not be violated.

#### C. DISCHARGE SPECIFICATIONS

Discharges of FCS wastes shall comply with all of the following specifications:

##### 1. DOCUMENTATION FOR SOURCE(S) OF FCS WASTE

Provide the RWQCB with a completed FCS certification form and supporting analytical data (per Section A.1. of this Order) for each individual source of FCS waste discharged at the site.

##### 2. SITE CONDITIONS

The proposed disposal site shall meet the following minimum conditions:

- a. **Groundwater Dependent Area Protection:** The disposal site shall not be located in an area that is dependent on groundwater for the sole source of drinking water.
- b. **Industrial Reuse Restriction:** The disposal site shall only have an industrial or commercial use such as a road bed, commercial fill site or other use that limits potential human exposure. Residential properties shall not to be used as disposal sites. If a structure is to be constructed over the disposal site an approval must be obtained from the appropriate local agencies
- c. **Separation from Ground Water:** The FCS waste shall be placed at least five feet above the highest anticipated level of ground water. The soil that separates the FCS waste from groundwater shall have a significant clay content (greater than 5% clay-sized material) or a permeability of less than  $10^{-5}$  cm/sec.



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- d. **Separation from Surface Water:** The waste shall be placed at least 100 feet from the nearest surface water.
- e. **Flood Plan Protection:** The waste shall be protected against 100 year peak stream flows as defined by the County flood control agency.
- f. **Cover:** The waste shall be covered by either 1) engineered materials (e.g. used as road base, fill beneath buildings, bridge abutments), or 2) not less than 2 feet of noncontaminated, clean fill. The cover shall either provide a permeability of  $10^{-5}$  cm/sec, or it shall be soil compacted to maximum 90% relative maximum compaction. Placement of a cover on the waste shall be completed with 30 days of revising/discharging the final load of wastes at the site.
- g. **Property Owner Acknowledgment:** By signature on the attached FCS certification form written correspondence to the RWQCB, the property owner shall approve the placement of the FCS waste at the site.

### 3. FUEL CONSTITUENT CONCENTRATION LIMITS

The results of sampling and analyses of FCS wastes shall be subject to either the primary level (a) **and/or** the secondary level (b) conditions listed below.

- a. **Primary Level Conditions (First Tier):** The upper 80% confidence interval value of the mean concentrations resulting from the primary analyses of the samples shall not exceed the concentration limits for the primary constituents of concern listed in **Table 1**. If the primary level conditions are not met, the FCS waste samples exhibiting the highest concentrations as a result of the primary analyses (**a minimum of 4 samples for all parameters tested**) shall be further analyzed for the secondary constituents of concern (**Table 2**).

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**Table 1. Primary Concentration Limits for Fuel Constituents in FCS wastes**

Type of Contaminant	Constituent of Concern	Carbon Range	Concentration Limit
Gasoline/Av-Gas	TPH-Gasoline	C <sub>6</sub> -C <sub>12</sub>	≤10 mg/kg
Diesel Fuel/ kerosene/ jet fuel/ bunker fuel	TPH-Diesel	C <sub>10</sub> -C <sub>30</sub>	≤100 mg/kg
ALL	Benzene		≤1 µg/kg
ALL	Toluene		≤150 µg/kg
ALL	Ethylbenzene		≤700 µg/kg
ALL	Xylenes		≤1,750 µg/kg
Gasoline	MTBE		≤ 13 µg/kg

**KEY to TABLE 1:**

Gas/Av-Gas = concentration limit required for FCS containing gasoline and aviation gasoline constituents

Gasoline = concentration limit required for FCS containing only gasoline constituents

Diesel Fuel/ kerosene/ jet fuel/ bunker fuel = concentration limit required for FCS containing the listed fuel constituents

ALL = analyses required for FCS containing any fuel constituent identified in this Order.

- b. *Secondary Level Conditions (Second Tier):* The upper 80% confidence interval value of the mean concentrations resulting from the secondary analyses shall not exceed the concentration limits for the secondary constituents of concern listed in **Table 2.**



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**Table 2. Secondary (Leachable) Concentration Limits for Fuel Constituents in FCS Wastes**

Type of Contaminant	Constituent of Concern	Carbon Range	Concentration Limit
Gas/Av-Gas	TPH-Gas	C <sub>6</sub> -C <sub>12</sub>	≤ 100 mg/kg
Diesel Fuel/ kerosene/ jet fuel/ bunker fuel	TPH- Diesel	C <sub>10</sub> -C <sub>30</sub>	≤ 500 mg/kg
Diesel Fuel/ kerosene/ jet fuel/ bunker fuel	TPH-Diesel	C <sub>10</sub> -C <sub>30</sub>	≤50 µg/L
ALL	Benzene		≤0.5 µg/L
ALL	Toluene		≤75 µg/L
ALL	Ethylbenzene		≤350 µg/L
ALL	Xylenes		≤900 µg/L
Gasoline	MTBE		≤ 7 µg/L

**KEY to TABLE 2:**

Gas/Av-Gas = concentration limit required for FCS containing gasoline and aviation gasoline constituents

Gasoline = concentration limit required for FCS containing only gasoline constituents

Diesel Fuel/ kerosene/ jet fuel/ bunker fuel = concentration limit required for FCS containing the listed fuel constituents

ALL = analyses required for FCS containing any fuel constituent identified in this Order.

**4. EROSION CONTROLS AND STORMWATER PROTECTION**

The discharger shall develop and implement best management practices (BMPs) for effective control of erosion and discharges of wastes from the site. Sites receiving discharges of FCS wastes for reuse/disposal, under this Order, shall comply with the requirements of Order 99-08-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No.

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CAS000002, "Waste Discharge Requirements for Discharges of Storm Water Associated Construction Activity."

#### 5. DISCHARGES OF WASTES TO TEMPORARY WASTE PILES

Any discharger who creates one or more temporary waste piles of FCS wastes that do not qualify for a conditional waiver of WDRs, pursuant to either a site-specific conditional waiver issued by the RWQCB or the RWQCB waiver policy, shall comply with the following requirements:

- a. **Site Conditions:** All parcels of land/property receiving a temporary discharges of FCS wastes (i.e., temporary waste piles) under this Order, shall meet the following minimum general site conditions:
  - i. **Runon/Runoff Protection:** Surface drainage shall be diverted from the temporary waste piles. For all waste piles, the dischargers shall implement effective Best Management Practices (BMPs) to prevent surface water runon and runoff from contacting wastes and to prevent erosion and transport of wastes by surface runoff.
  - ii. **Groundwater Protection:** All waste piles shall be placed at least five feet above the highest anticipated level of groundwater.
  - iii. **Surface Water Protection:** All waste piles established under this waiver shall be located not less than 100 feet from any surface water identified in the Basin Plan.
  - iv. **Flood Plain Protection:** All waste piles shall be protected against 100-year peak stream flows as defined by the County flood control agency.
- b. **Inspection and Maintenance:** The discharger shall regularly inspect and maintain wastes discharged to temporary waste piles established under this Order. Inspections shall be conducted at a frequency that will ensure the discharge of FCS wastes does not create conditions of pollution or nuisance. The discharger shall report on the disposition of all temporary waste piles at the time of the final inspection conducted pursuant to **Section E (INSPECTION RESULTS)** of this Order.
- c. **Clean Closure Required:** The discharger shall properly dispose of the following in accordance with all applicable requirements and regulations: all waste piles established under this Order, together with any materials used to contain the temporary waste piles, underlying geologic materials contaminated by the discharge, treatment facilities, and related equipment.



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- d. **Management of Return or Pondered Water:** If return water or pondered water contained within the treatment or storage area of the temporary waste pile will be disposed of at a location other than to a sanitary sewer system, then the discharger shall submit written notification to the RWQCB prior to initiating the discharge and either: 1) obtain waste discharge requirements; 2) obtain a waiver of waste discharge requirements or 3) obtain a written determination from the RWQCB Executive Officer that the disposal of the return water or pondered water is not subject to regulation by the RWQCB.
- e. **Property Owner Acknowledgment:** By written correspondence to the RWQCB, the property owner shall approve the placement of the waste (temporary waste piles) at the site.
- f. **Public Notification Requirement:** The discharger shall post at least one clearly visible, sign (in english) listing the following minimum information: a.) project name, b.) name and address of discharger, c.) brief project description, and d.) 24-hour contact information – name, address, facsimile, and telephone number for the project. The discharger shall post additional signs as necessary (in languages other than english) to more effectively communicate the minimum contact information (listed above) to the local community. The sign(s) shall be maintained as required to keep them legible and remain in place while temporary waste piles remain on site.
- g. **Obligation to Comply:** Compliance with this Order does not relieve discharger of the obligation to comply with any other applicable local, state and federal requirements.
- h. **Maximum Time Limit.** Temporary waste piles established under this Order shall be limited to a maximum time period of **30-days** after the RWQCB receives the final technical report required in **Section F (FINAL DISPOSITION OF WASTE)** of this Order.
- i. **Source(s) of FCS Waste:** The discharger shall provide the RWQCB with complete information, for each source of FCS wastes, as required by **Section C.1 (DISCHARGE SPECIFICATIONS)** of this Order.
- j. **Cover:** All waste piles shall be overlain by plastic sheeting (not less than 10 mils thick) to adequately prevent infiltration of rainwater, control fugitive dust, and other nuisances.

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- k. **Liner:** All waste piles shall be underlain by either plastic sheeting (not less than 10 mils thick) or a liner of low permeability approved by the RWQCB.

#### **D. REPORTING REQUIREMENTS**

##### **1. GENERAL REPORTING REQUIREMENTS**

The discharger is required to comply with the following minimum reporting requirements:

- a. Submit to the RWQCB a FCS certification report (form attached to this Order) at least **30 days** prior to reuse or disposal of FCS wastes at a site, other than a Classified waste management unit. Comments received in response to the public notification are to be forwarded to the RWQCB with the certification report.
- b. Pursuant to Section 13260(a) of the California Water Code, prior to disposal, submit a Report of Waste Discharge (RWD) for site specific waste discharge requirements if both the primary **and** secondary level conditions listed above (**Discharge Specification C.3.a and C.3.b**) are not met.
- c. **Other Constituents:** The discharger shall report leachable concentrations of any other waste constituents, not listed in **Discharge Specification C.3.b.** (Table 2), that may be present in concentrations that could pose a threat to water quality at the proposed disposal site.
- d. Furnish to the RWQCB, within a reasonable time, any information which the RWQCB Executive Officer may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order. The discharger shall also furnish to the RWQCB upon request, copies of all records required to be kept under this Order.

##### **2. CHANGE IN OWNERSHIP**

The discharger shall notify the RWQCB, in writing, **at least 30 days** in advance of any proposed transfer of ownership or responsibility for maintenance of a site/facility subject to this Order. The discharger shall include with such notification, written acknowledgement by the prospective purchaser or successor in responsibility executed under penalty of perjury under the laws of the state of California, that such purchaser or successor has read and understood the requirements contained herein and will accept responsibility for compliance therewith as of the date of transfer of ownership or responsibility.



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### 3. INCOMPLETE REPORTS

Where the discharger becomes aware that it failed to submit any relevant facts in a Report of Waste Discharge (RWD) or submitted incorrect information in a RWD or in any report to the RWQCB, it shall promptly submit such facts or information.

### 4. ENDANGERMENT OF HEALTH AND ENVIRONMENT

The discharger shall report any noncompliance, which may endanger health or the environment. Any such information shall be provided orally to the RWQCB **within 24 hours** from the time the owner becomes aware of the circumstances. A written submission shall also be provided **within five days** of the time the owner becomes aware of the circumstances, provided that no written report need be submitted if the RWQCB waives the requirement for such written report upon timely receipt of a satisfactory oral report. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected; the anticipated time it is expected to continue, and steps taken or planned to reduce, eliminate, or prevent recurrence of the noncompliance.

### 5. OTHER INFORMATION

When the discharger becomes aware of a failure to submit any relevant facts in an application for Waste Discharge Requirements or submitted incorrect information in a permit application, or in any report to the RWQCB, the facts of information shall be promptly submitted.

### 6. FALSE REPORTING

Any person who knowingly makes any false statement, representation, or certification any record or other document submitted or required to be maintained under this Order, including monitoring reports or reports of compliance or noncompliance shall be subject to enforcement procedures as identified in the **Provision G.9.** of this Order.

### 7. ANTICIPATED NONCOMPLIANCE

Provide advance notice to the RWQCB of any planned changes in the facility or discharge activity that may result in noncompliance with the waste discharge requirements.

### 8. MONITORING AND REPORTING PROGRAM

Monitoring and analytical results shall be reported to the RWQCB as specified in the attached **Monitoring and Reporting Program No. R9-2002-0342.**

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## 9. REPORT DECLARATION

All applications, reports, or information submitted to the RWQCB shall be signed and certified as follows:

- a. The Report of Waste Discharge (RWD) shall be signed as follows:
  1. **For a corporation** - by a principal executive officer of at least the level of vice-president.
  2. **For a partnership or sole proprietorship** - by a general partner or the proprietor, respectively.
  3. **For a municipality, state, federal or other public agency** - by either a principal executive officer or ranking elected official.
  4. **For a military installation** - by the base commander or the person with overall responsibility for environmental matters in that branch of the military.
- b. All other reports required by this Order and other information required by the RWQCB shall be signed by a person designated in paragraph (a) of this provision, or by a duly authorized representative of that person. An individual is a duly authorized representative only if:
  1. The authorization is made in writing by a person described in paragraph (a) of this provision;
  2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity; and
  3. The written authorization is submitted to the RWQCB.
- c. Any person signing a document under this Section shall make the following certification:

" I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

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10. RWQCB ADDRESS

The discharger shall submit reports required under this Order, and other information requested by the RWQCB, to:

Executive Officer  
California Regional Water Quality Control Board  
San Diego Region  
9174 Sky Park Court, Suite 100  
San Diego, California 92123-4340  
Attn: Land Discharge Unit Supervisor

**E. SITE INSPECTION RESULTS**

1. The discharger shall perform a **final site inspection** after the discharge of waste has been completed at the site. The results of that inspection, and any supporting documentation, shall be submitted to the RWQCB in an appendix to the final summary report required by **Section F** of this Order and Monitoring and Reporting Program R9-2002-0342. The report shall contain a discussion of any significant findings regarding:
  - a) General site condition;
  - b) FCS waste piles and the condition thereof;
  - c) Disposition of FCS wastes reused/disposed at the site;
  - d) Storm water conveyance and erosion control BMPs located on and immediately off the site;
  - e) Maintenance activities at the site.

**F. FINAL DISPOSITION OF WASTE**

For each discharge of waste to an unclassified waste management unit the discharger shall report all information that is necessary for the RWQCB to assess compliance with the **Discharge Specifications Section C** of this Order. This information shall be reported as an appendix pursuant to **Reports To Be Filed With the RWQCB, Section C** in compliance with the schedule required in Monitoring and Reporting Program R9-2002-0342.



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## **G. PROVISIONS**

### **1. OBLIGATION TO COMPLY**

The discharger shall comply with all conditions of this Order. Any noncompliance with this Order constitutes a violation of the California Water Code and is grounds for: (a) enforcement action; or (b) termination, revocation and reissuance, or modification of this Order.

### **2. CORRECTION OF ADVERSE IMPACTS**

The discharger shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this Order, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the noncompliance.

### **3. PROPER OPERATION AND MAINTENANCE**

The discharger shall, at all times, properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the discharger to achieve compliance with conditions of this Order. Proper operation and maintenance includes effective performance, adequate laboratory and process controls including appropriate quality assurance procedures.

### **4. PROPERTY RIGHTS**

This Order does not convey any property rights of any sort or any exclusive privileges, including any authorization to discharge solid waste or maintain an inactive landfill. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the discharger from liability under federal, state, or local laws, nor create a vested right for the owner and operator to continue the regulated activity.

### **5. ENTRY AND INSPECTION**

The discharger shall allow the RWQCB, or an authorized representative upon the presentation of credentials, to:

- a. Enter upon the discharger premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Order;
- b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order;

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- c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and
- d. Sample or monitor at reasonable times, for the purposes of assuring compliance with this Order or as otherwise authorized by the California Water Code, any substances or parameters at any location.

#### 6. REPOSITORY FOR WASTE DISCHARGE REQUIREMENTS

A copy of this Order shall be maintained at the local offices of the discharger and shall be available to operating personnel at all times.

#### 7. SEVERABILITY

The provisions of this Order are severable, and if any provision of this Order or the application of any provision of this Order to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this Order, shall not be affected thereby.

#### 8. PUBLIC NOTIFICATION

Public notification shall be completed at least **30 days** prior to the discharge (for disposal or reuse) of FCS wastes at the site. Adjacent property owners and other interested parties are to be notified of the plans for the disposal/reuse of FCS wastes. The discharger shall provide the RWQCB with written documentation of the required public notification.

#### 9. ENFORCEMENT

In the case of an enforcement action, the following provisions shall apply:

- a. The provisions in this enforcement section shall not act as limitation on the statutory or regulatory authority of the RWQCB.
- b. Any violation of this Order constitutes violation of the California Water Code and is basis for enforcement action, termination of the order, revocation and reissuance of the Order, denial of an application for reissuance of the Order or a combination thereof.
- c. It shall not be a defense for a discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Order.

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- d. The California Water Code provides that any person who intentionally or negligently violates any waste discharge requirements issued, reissued, or amended by this RWQCB is subject to administrative civil liability of up to five thousand (5,000) dollars per day of violation. The Superior Court may impose civil liability of up to fifteen thousand (15,000) dollars per day of violation.
- e. The California Water Code provides that any person failing or refusing to furnish technical or monitoring program reports, as required under this Order, or falsifying any information provided in the monitoring reports is guilty of a misdemeanor.

10. DEVELOPMENT AND IMPLEMENTATION OF BEST MANAGEMENT PRACTICES

The discharger shall develop and implement effective best management practices (BMPs) to comply with **Discharge Specifications Sections C.4** of this Order.

**H. NOTIFICATIONS**

- 1. Definitions of terms used in this Order shall be as set forth in California Code of Regulations, Title 27.
- 2. This Order becomes effective on the date of adoption by the RWQCB and will supercede Resolution Order No. 95-63.

I, John H. Robertus, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Water Quality Control Board, San Diego Region on December 11, 2002.

  
JOHN H. ROBERTUS  
Executive Officer



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN DIEGO REGION

MONITORING AND REPORTING PROGRAM NO. R9-2002-0342  
FOR THE DISPOSAL AND/OR REUSE OF  
PETROLEUM FUEL CONTAMINATED SOILS (FCS)  
IN THE SAN DIEGO REGION

**A. MONITORING PROVISIONS**

1. Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.
2. Monitoring must be conducted according to United States Environmental Protection Agency test procedures approved under the most current version of Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, U.S. Environmental Protection Agency.
3. All analyses shall be performed in a laboratory certified to perform such analyses by the California Department of Health Services.
4. If the discharger monitors any pollutants more frequently than required by this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the discharger's monitoring report. The increased frequency of monitoring shall also be reported.
5. The discharger shall retain records of all monitoring information, including all calibration and maintenance records, copies of all reports required by this Order, and records of all data used to complete the application for this Order. Records shall be maintained for a minimum of five years from the date of the sample, measurement, report or application. This period may be extended during the course of any unresolved litigation regarding this discharge or when requested by the San Diego Regional Water Quality Control Board (RWQCB).
6. All monitoring instruments and devices that are used by the discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary to ensure their continued accuracy.
7. The discharger shall report all instances of noncompliance, not reported under the **Reporting Requirement D.4.** of Order No. R9-2002-0342, at the time the final report is submitted (see **Final Disposition of Wastes, Section F** of Order No. R9-2002-0342).
8. Records of monitoring information shall include:

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- a. The date, identity of sample monitoring point from which it was taken, weather conditions at time of sampling, and time of sampling or measurement;
  - b. The names and qualifications of individual(s) who performed the sampling or measurements;
  - b. Date and time that analyses were started and completed, and the name of the personnel performing each analysis;
  - c. The analytical techniques or method(s) used, including method of preserving the sample and the identity and volumes of reagents used;
  - d. Calculation of results;
  - e. Results of analyses and the practical quantitation limit (PQL) and method detection limit (MDL) for each parameter; and
  - g. Laboratory quality assurance results (*e.g.* percent recovery, response factor)
6. Technical reports shall be signed by an authorized person as required by the **Reporting Requirement D.9.** of Order No. R9-2002-0342.

**B. WASTE MONITORING**

The discharger shall ensure that all FCS wastes are discharged in compliance with the requirements of **Sections B (Discharge Prohibitions)** and **Section C (Discharge Specifications)** of Order R9-2002-0342. The characterization of FCS wastes shall be performed as required below:

1. The discharger shall monitor the wastes from each source using the following parameters and report results to the RWQCB as required in **Eligibility, Section A** of Order R9-2002-0342.
2. Each source of petroleum hydrocarbon fuel contaminated soil ("*FCS waste*") disposed of or reused at the facility shall be sampled and analyzed as follows:
  - a) **Sampling:** All samples of FCS wastes shall be collected in accordance with sampling guidelines set forth in the test procedures approved under the most current version of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846", U.S. Environmental Protection Agency.
  - b) **Analysis:** The minimum detection levels for the methods prescribed in this Order are listed in **Table 1** of this Monitoring and Reporting Program.

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**Table 1. Test Methods and Minimum Detection Levels for Fuel Constituents in FCS Wastes**

Type of Contaminant	Constituent of Concern	Ext. Method SPLP	Carbon Range	Prep. Method	DHS/EPA Method of Analysis	Minimum Detection Level
Gasoline/Av-Gas	TPH-Gasoline		C <sub>6</sub> -C <sub>12</sub>	5035	8015M/DHS	10 mg/kg
Diesel Fuel/ kerosene/ jet fuel/ bunker fuel	TPH-Diesel Fuel		C <sub>10</sub> -C <sub>30</sub>	5035	8015M/DHS	10 mg/kg
Gasoline	MTBE			5035	8260B	5 µg/kg
All	BTEX			5035	8021	0.5 µg/kg
Diesel Fuel/ kerosene/ jet fuel/ bunker fuel	Leachable Diesel Fuel	Method 1312	C <sub>10</sub> -C <sub>30</sub>	5035	8015M/DHS	50 µg/L
All	Leachable BTEX	Method 1312		5035	8021	0.5 µg/L
Gasoline	Leachable MTBE	Method 1312		5035	8260B	5 µg/L

**KEY to TABLE 1:**

Gas/Av-Gas = concentration limit required for FCS containing gasoline and aviation gasoline constituents

Gasoline = concentration limit required for FCS containing only gasoline constituents

Diesel Fuel/ kerosene/ jet fuel/ bunker fuel = concentration limit required for FCS containing the listed fuel constituents

ALL = analyses required for FCS containing any fuel constituent identified in this Order.

3. All FCS wastes discharged under this Order must be sampled and analyzed using the following minimum requirements:
  - a) **Sampling:** For quantities of FCS waste less than or equal to 500 cubic yards, a **minimum of four samples per 100 cubic yards** will be taken. For quantities of FCS waste above 500 cubic yards, an additional sample shall be collected for every 500 cubic yards. In all cases, a **minimum of four samples** shall be analyzed for either primary and/or secondary level



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analyses as set forth in **Discharge Specifications C.3.a. and C.3.b.** of Order R9-2002-0342.

- b) **Primary Level Conditions:** The waste samples shall be analyzed for the primary constituents of concern as listed in **Discharge Specification (Section C.3.a. - Table 1)** of Order R9-2002-0342.
- i) Primary Level Conditions-Gas/Av-Gas.  
FCS wastes containing gasoline or aviation gasoline constituents shall be analyzed using the DHS method or EPA Method 8015 modified to quantify the concentration of total petroleum hydrocarbons (TPH) through the carbon range C<sub>6</sub> to C<sub>12</sub>. The minimum detection limit for TPH using these criteria shall be no greater than 10 mg/kg. Additionally, the FCS wastes shall be analyzed using EPA Method 8021 to quantify the concentrations of benzene, toluene, ethylbenzene, and total xylenes (BTEX) and EPA Method 8260B to quantify concentrations of MTBE (for gasoline only). The minimum detection limits shall be as follows: for BTEX analyses by EPA Method 8021 detection limits shall be no greater than 0.5 µg/kg and for MTBE by EPA Method 8260B detection limits shall be no greater than 0.5 µg/kg.
- ii) Primary Level Conditions -Diesel fuel/kerosene/jet fuels/bunker fuel. FCS Wastes containing diesel fuel, kerosene, jet fuels, or bunker fuel constituents shall be analyzed using the DHS/EPA Method 8015 modified to quantify the concentration of total petroleum hydrocarbons through the carbon range C<sub>10</sub> to C<sub>30</sub>. The minimum detection limit for TPH using these criteria in FCS wastes shall be no greater than 10 mg/kg. Additionally, the FCS wastes shall be analyzed using EPA Methods 8021 to quantify the concentrations of BTEX. The minimum detection limits for BTEX analyses by EPA Method 8021 shall be no greater than 0.5 µg/kg.
- c) **Secondary Analysis:** If the primary level conditions (**Discharge Specification C.3.a - Table 1** of Order R9-2002-0342) are not met, the samples of FCS wastes exhibiting the highest concentrations as a result of the primary analyses (**a minimum of 4 samples** for all parameters tested) shall be further analyzed for the secondary constituents of concern conditions (**Discharge Specification C.3.b. - Table 2** of Order R9-2002-0342).
- i) Secondary-Gasoline/Av-Gas.  
For secondary analysis, samples of FCS wastes containing gasoline or aviation gasoline constituents shall be extracted using the Synthetic Precipitation Leaching Procedure (SPLP) using a zero

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headspace extractor. Procedures for the SPLP are described in EPA method 1312 of "Test Methods for Solid Waste, SW 846". The SPLP waste extract shall be analyzed for BTEX using Method 8021 and analyzed for MTBE using Method 8260B (for gasoline only). The minimum detection limit for BTEX in waste extract, using Method 8021, shall be no greater than 0.5  $\mu\text{g/L}$ . The minimum detection limit for MTBE in the SPLP waste extract, using Method 8260B, shall be no greater than 5  $\mu\text{g/L}$ .

ii) Secondary- Diesel fuel/kerosene/jet fuels/bunker fuel.

For secondary analysis, samples of FCS wastes containing diesel fuel, kerosene, jet fuel, or bunker fuel constituents shall be extracted using the Synthetic Precipitation Leaching Procedure (SPLP) using a zero headspace extractor. Procedures for the SPLP are described in EPA method 1312 of "Test Methods for Solid Waste, SW 846". The SPLP waste extract shall be analyzed for diesel fuel constituents using DHS/EPA Method 8015 modified to quantify the concentration of total petroleum hydrocarbons (TPH) through the carbon range  $\text{C}_{10}$  to  $\text{C}_{30}$ , and BTEX using Method 8021. The minimum detection limit for TPH analyses in the waste extract (8015M) shall be no greater than 50  $\mu\text{g/L}$ . The minimum detection limit for BTEX in waste extract, using Method 8021, shall be no greater than 0.5  $\mu\text{g/L}$ .

4. The RWQCB Executive Officer may consider alternative analytical methods and protocols proposed by the discharger. However, discharger must provide the RWQCB with acceptable justification to support proposed alternatives to protocols set forth in this Monitoring and Reporting Program.
5. Under authority of Water Code Section 13267(a), the discharger may be required to submit additional analyses for other waste constituents (*e.g.*, for other fuel additives or degradation products thereof) or additional monitoring reports as deemed appropriate by the RWQCB Executive Officer.

**C. REPORTS TO BE FILED WITH THE RWQCB**

Under authority of Water Code Section 13267(a), all reports shall be submitted no later than **60 days** following final discharge of FCS waste at the site. The report shall be comprised of the following in addition to the specific contents listed below:

**1. Transmittal Letter**

A letter summarizing the essential points shall be submitted with each report. The transmittal letter shall include:

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- a. A discussion of any requirement violations found and actions taken or planned for correcting the violations. If no violations have occurred, this shall be stated in the transmittal letter; and
- b. A statement certifying that, under penalty of perjury, that to the best of the signer's knowledge the report is true, complete, and correct as required in **Reporting Requirements (Section D.9.c.)** of Order R9-2002-0342. An individual that meets the requirements contained in **Reporting Requirements (Section D.9.a. or D.9.b.)** of Order R9-2002-0342) shall sign the required statement.

## 2. Waste Monitoring Report

The discharger shall submit to the RWQCB a final summary technical report. The final report shall include, but not be limited to the following:

- a. A completed FCS certification form (attached to Order R9-2002-0342) for each separate source (*i.e.*, unauthorized release case) of petroleum hydrocarbon fuel contaminated soils (FCS wastes) discharged at the site.
- b. The following information shall be attached to each completed FCS certification form:
  - i. Copy of the laboratory data sheets for analytical results from the waste
  - ii. Complete copy of applicable laboratory quality assurance/quality control (QA/QC) data.
  - iii. The discharge shall provide the information in 2.b.i and 2.b.ii (above) as an appendix to the Final Summary Report pursuant to **Section F (Final Disposition of Wastes)** of Order R9-2002-0342.
- c. Where the reuse of FCS wastes is part of an individual site redevelopment project (involving only one parcel/property), the discharger shall provide the RWQCB with an estimated completion date for the site-specific redevelopment work.
- d. Where the reuse of FCS wastes is part of a larger redevelopment project, involving multiple properties/parcels/sites, the discharger shall also provide the RWQCB with an estimated completion date for the final redevelopment project.



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**D. REPORTING SCHEDULE**

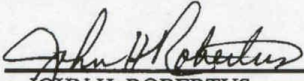
Under authority of Water Code Section 13267(a), the discharger is required to comply with the following minimum reporting schedule:

<u>Reporting Frequency</u>	<u>Report Period</u>	<u>Report Due</u>
One Time	Duration of Project	Within <b>60 days</b> after discharge of FCS waste is completed.

Reports shall be submitted to the RWQCB Executive Officer:

Executive Officer  
California Regional Water Quality Control Board  
San Diego Region  
9174 Sky Park Court, Suite 100  
San Diego, California 92123-4340  
Attention: Supervisor Land Discharge Unit

Ordered by:

  
JOHN H. ROBERTUS  
Executive Officer  
December 11, 2002

## VIII. LABORATORY QA/QC REPORTING GUIDELINES

In the laboratory, QA/QC is protocol designed to verify and maintain a desired level of quality in the analytical process. QA/QC requires careful planning, continued inspection, and appropriate corrective action.

### A. Definitions

The commonly used laboratory QA/QC terms are described for the purpose of consistency in San Diego County. It is recognized that other terminology is used in other geographical areas.

#### 1. Calibration Standard (CS)

A standard containing known quantities of target analyses, prepared from traceable stock materials of known, certified quality obtained from a reliable source or sources. Used to calibrate analytical instrument response.

#### 2. Calibration Verification Standard (CVS)

A standard containing known quantities of target analyses, prepared from traceable stock materials of known, certified quality obtained from a reliable source or sources independent from those associated with the corresponding calibration standards. Often obtained as a Quality Control (QC) Check Standard prepared by an outside source. Used to verify the accuracy of the analytical instrument calibration. (See also *Laboratory Control Standard*.)

#### 3. Instrument Detection Limit (IDL)

The smallest quantity of an analyte that can be statistically differentiated from the baseline noise level of an instrument without regard to sample matrix characteristics or to the specific sample preparation and analysis methods employed.

#### 4. Laboratory Control Sample/Blank Spike (LCS)

A "clean," analyte-free matrix sample (e.g., organic-free or deionized water) spiked with known concentrations of target analyses and carried through the same, entire sample preparation and analysis procedure used for samples. LCS spiking stocks are normally prepared from traceable standard materials of known, certified quality obtained from a reliable source or sources independent from those associated with the corresponding calibration standards. (Note: For those methods that treat all standards and samples alike except perhaps for sample aliquot size, the Calibration Verification Standard also qualifies as a Laboratory Control Sample/Blank Spike.) LCS recoveries are used to estimate overall analytical method accuracy independent of sample matrix effects. Also used to demonstrate overall routine method performance. (See also: *Calibration Verification Standard*; *Method Blank*.)

#### 5. Matrix

The combination of physical and chemical properties of a group of samples which are similar enough to be analyzed together and evaluated by the same quality control criteria. Air, water, soil, tissue, etc., are some general terms typically used to refer to different matrix types.



## 6. Matrix Spike (MS)

An aliquot of sample spiked with known concentrations of target analyses. Matrix spike recoveries are used to estimate overall sample matrix-dependent analytical method accuracy, and to characterize matrix interference effects.

## 7. Matrix Spike Duplicate (MSD)

Separate sample aliquot spiked with known concentrations of target analyses. Results of the analysis of matrix spike duplicates are used to estimate overall method precision.

## 8. Method Blank

A "clean", analyte-free matrix sample (e.g., organic-free or deionized water) carried through the same, entire sample preparation and analysis procedure used for samples. Measures the overall levels of contamination for the method.

## 9. Method Detection Limit (MDL)

The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero, as determined by a specific method. The MDL takes into account the effects of reagents and preparation and analysis steps.

## 10. Percent Recovery

Calculated for Matrix Spike, Surrogate, and LCS data, and used to estimate the accuracy of all or part of a measurement process. Matrix Spike Percent Recovery (MSPR) is usually calculated from the results of analyses of samples and their respective sample matrix spikes, according to the following general equation:

$$\text{MSPR} = \frac{\text{SSR} - \text{SR}}{\text{SA}} \times 100 \quad \text{Equation E-1}$$

where:

MSPR	=	Matrix Spike Percent Recovery
SSR	=	Spike Sample Result
SR	=	Sample Result
SA	=	Spike Added

Surrogate and LCS recoveries are calculated in a similar manner.

## 11. Relative Percent Difference

Calculated for sample duplicate and matrix spike duplicate data, and used to estimate overall method precision. Relative Percent Difference (RPD) of the results of analyses of sample duplicates is normally calculated according to the following general equation:

$$\text{RPD} = \frac{S - D}{\text{Average}} \times 100 \quad \text{Equation E-2}$$

$$(S + D) / 2$$

where:     RPD     =   Relative Percent Difference  
              S        =   First Sample Value (original)  
              D        =   Second Sample Value (duplicate)

RPD for matrix spike duplicate results is calculated in a similar manner

## **12. Reporting Detection Limit (RDL)**

The minimum concentration of a substance in a specific sample that can be measured and reported with a known and specified level of confidence that the analyte concentration is greater than zero, as determined by a specific method. Typically determined as the corresponding Method Detection Limit (MDL) to which the appropriate adjustments and qualifiers for sample matrix type, aliquot size, sample dilutions of pre-concentrations, and observed interferences have been applied and appended.

## **13. Sample Duplicates**

Separate sample aliquot taken through the entire preparation and analysis procedure. Results of the analyses of sample duplicates are used to estimate overall method precision.

## **14. Surrogate**

An organic compound similar in compositional, extraction, and chromatographic character and behavior to one or more target analyses but not normally found in environmental samples. In GC/MS methods, sample aliquots are spiked with surrogates, and surrogate recoveries are used to indicate method efficiency and can, with qualifications, be used to estimate overall method accuracy.

TABLE E-2: LABORATORY QA/QC REPORTING GUIDELINES

QA/QC Parameters	Indicator of	Required for	Description
Sample duplicate; Matrix Spike duplicate	Precision	All sample analyses	The results of all sample duplicate and/or matrix spike duplicate (MS/MSD) analyses, together with the derived Relative Percent Differences (RPD), should be reported for analytes detected to provide the requisite estimates for <u>precision</u> . Minimum frequency; 5% per batch.
Sample Matrix Spike & Surrogate Recovery Results	Accuracy	All sample analyses. For exceptions, see description note.	The results of all sample matrix spike analyses, together with the derived Matrix Spike Percent Recoveries (MSPR), should be reported for spiked analytes to provide the requisite estimates for <u>accuracy</u> . Minimum frequency; 5% per batch. For mass spectrometric analyses, surrogate spike recoveries may be reported in lieu of matrix spike recoveries unless otherwise directed by DEH.
Reporting Detection Limit	Sample specific limit of detection	All sample analyses	Sample-based, matrix-dependent and method-specific Reporting Detection Limits (RDL) should be reported for all target analytes. A detailed derivation of these RDL, including all statistical formulas and all method- and sample-specific pre-concentration and dilution terms should be made available upon request.
Method blanks	In-house lab contamination	All sample analyses	Either report the results of all method blank analyses for target analytes or provide a statement indicating that target analytes are within laboratory control limits. Any out of control conditions should be explained. Minimum frequency; 5% per batch.
Laboratory Control Sample/Blank Spike	Method Control and Method Accuracy	Required whenever sample matrix spike is outside Control limits or when matrix spiking is not appropriate.	The results of any relevant Laboratory Control Sample/Blank Spike (LCS) analyses, together with the derived Laboratory Control Standard Recoveries (LCSR), should be reported whenever sample matrix spike recoveries are found to be outside the appropriate control limits or whenever matrix spiking is not appropriate for the particular method or sample conditions. If both matrix spike and LCS recoveries are within control limits, a summary statement to the effect that all LCSR and MSPR results are within the specified control limits may be substituted for a detailed report of LCS and MSPR results.
Control Limits	Individual Lab Method Dependent Performance	All sample analyses	Appropriate method-derived or laboratory-defined control limits for reporting RPD, LCSR and MSPR should be provided with the QC report to facilitate the interpretation and evaluation of precision and accuracy estimates. Alternatively, a <b>current</b> copy of laboratory control limits should be on file with DEH or made available to the consultant upon request.
Chain of Custody	Sample integrity	All sample analyses	Copies of the completed chain-of-custody forms should accompany the report. The condition (temperature, seals, etc.) of the sample(s) upon receipt by the laboratory should be noted.
<b>Supplemental Information:</b> <ol style="list-style-type: none"> <li>1) A complete listing of correlated laboratory sample codes and their respective field sample identifiers should be included in the report.</li> <li>2) The dates of sample acquisition, receipt, preparation, extraction, and analysis, including all QC samples for which detailed reporting is required (e.g., sample duplicates, sample matrix spikes, laboratory control samples), should be included in the report.</li> <li>3) The report should supply any supplemental information needed for the interpretation of QC data and the evaluation of data quality, including commentary on out-of-control conditions, sample matrix effects, observed laboratory contamination, anomalies associated with the samples or their analyses, and any other factors that could affect data quality.</li> <li>4) Calibration, calibration verification, and method blank analytical data need not be reported in detail but should be retained for possible future need. A summary statement to the effect that all such results are within the specified control limits may be substituted for a detailed report of the results.</li> <li>5) All raw data, chromatograms, laboratory logs, analyst notebooks, and other pertinent documentation should also be retained and should be made available for inspection upon request.</li> </ol>			

Note: These guidelines apply to site assessment and mitigation work only. For all other purposes, contact DEH.